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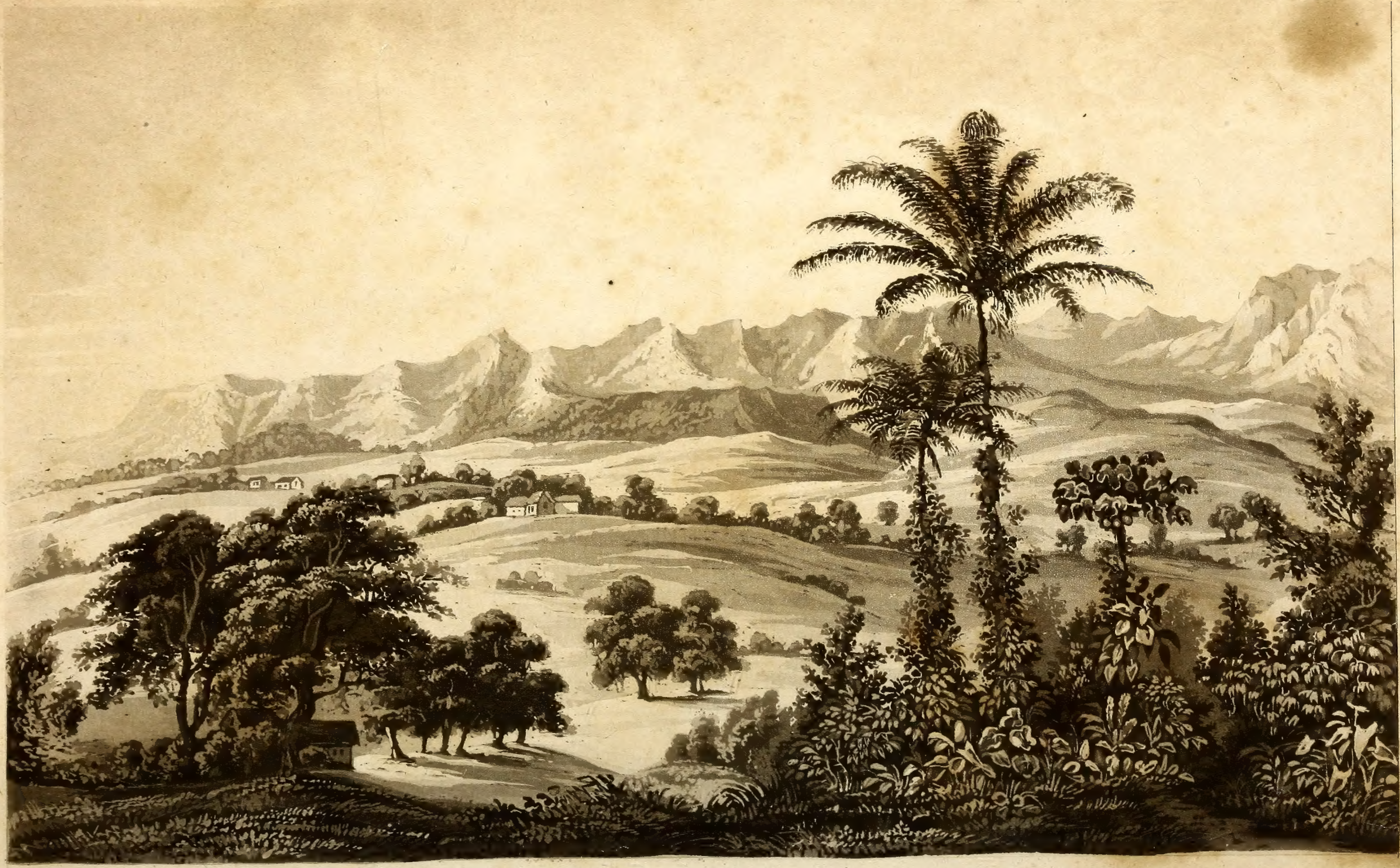

VILLA VELHA.

London, Published by Longman & C^{o}. 29, March, 1824.

TRAVELS

IN

BRAZIL,

IN THE YEARS

1817—1820.

UNDERTAKEN BY COMMAND OF

HIS MAJESTY THE KING OF BAVARIA.

BY

DR. JOH. BAPT. VON SPIX,
AND DR. C. F. PHIL. VON MARTIUS,
KNIGHTS OF THE ROYAL BAVARIAN ORDER OF CIVIL MERIT,
AND MEMBERS OF THE ROYAL ACADEMY OF
SCIENCES AT MUNICH, &c. &c.

VOLUME THE FIRST.

LONDON:
PRINTED FOR
LONGMAN, HURST, REES, ORME, BROWN, AND GREEN,
PATERNOSTER-ROW.
1824.

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TO

HIS MAJESTY

MAXIMILIAN JOSEPH THE FIRST,

KING OF BAVARIA.

SIRE,

WHEN Your Majesty had decided on sending a literary expedition to Brazil, you were pleased to confide to us the execution of this royal resolution.

Attachment to Your Majesty and to the sciences was the guardian Genius that guided us amidst the dangers and fatigues of so extensive a journey, through a part of the world so imperfectly known, and brought us back in safety, from that remote hemisphere, to our native land.

This undertaking, therefore, which is, perhaps, not without importance in the history of the Bavarian nation, owes its origin and its success to Your Majesty; and whatever advantages the sciences may derive from it, must be solely ascribed to the magnanimity and favour of a monarch, who, considering science as the highest ornament of humanity, founds upon it, by means of the wisest institutions, the happiness of his people.

Penetrated with feelings of the most profound gratitude, we, therefore, venture to approach Your Majesty's throne, and most respectfully to offer to the best of kings the first fruits of our mission.

Encouraged by Your Majesty's most gracious assurance, that, in the performance of our undertaking, we have fulfilled Your

Majesty's intentions, we are now animated by the wish that the literary description of its results may likewise be found worthy of the approbation of our beloved Sovereign.

With the most profound respect we are,

Sire,

Your Majesty's

Most devoted and

Most faithful subjects,

DR. J. B. VON SPIX.

DR. C. F. P. VON MARTIUS.

TRANSLATOR'S PREFACE.

At a period when the peculiar situation of the immense countries in America, formerly belonging to the crowns of Spain and Portugal, so powerfully claims the attention of the politician, the statesman, and the merchant, no more can be required to recommend a work like that here offered to the public, than the assurance that it is not a mere compilation, got up to meet the exigencies of the moment, but a real and authentic narrative, of a journey through a great extent of a most interesting country, hitherto but imperfectly, or not at all explored, and performed by persons every way qualified to gather ample materials for both instruction and entertainment. That such a feeling is very general may be inferred from the numerous works that have been published of late years relating to different parts of South America. In exploring this vast continent, peculiar merit belongs to the Germans, to whom the illustrious name of Von Humboldt alone, secures, without dispute, the palm of superiority. The removal of the Court of Portugal from Lisbon to Rio de

Janeiro, opened an extensive field of research, of which the Germans amply availed themselves. Many men, well-versed in different branches of science, especially mineralogy, entered into the service of the Court of Rio de Janeiro, and very interesting communications, sent by them, have been published in the German literary journals, though it is to be regretted that few of them have become known in this country. The marriage of an Austrian Princess with the Crown Prince of Brazil, gave, however, the most powerful stimulus to the German literati, and the fairest opportunity for visiting Brazil with all the advantages that the protection of the government could afford. Accordingly the Emperor of Austria sent several learned men, well skilled in the various departments of natural history and natural philosophy, in the suite of the Archduchess his daughter, and His Majesty the King of Bavaria embraced this favourable opportunity to send two members of the Academy of Sciences at Munich, who would thus be under the protection of the Austrian embassy, and enjoy the best recommendation to the Court of Rio de Janeiro. The particulars being detailed in the first chapter of this work, it is unnecessary to dwell on them here; but it may be observed that this is the first account yet published by any of the German literati who went to Brazil with the Austrian legation, excepting some essays on subjects of natural history, as well by the authors of this work, as by some of the Austrian naturalists which have appeared in different German journals. Professor Natterer, one of the most distinguished of the latter, has not yet returned to Europe, but may be expected in the course of this year. With regard to Messrs. Spix and Martius, they have adopted, in a great measure, the plan of Baron Von Humboldt, having published, besides this personal narrative, three or four separate works, each exclusively dedicated to some one branch of natural history.

As the volumes now offered to the public contain only the first half of the personal narrative, (the remaining part being in the press) it may not be irrelevant to acquaint the reader, that notwithstanding the interest which it is hoped will be excited by these volumes, it may be justly expected that the remaining part will be found to possess still greater novelty, and to afford more ample information, and more striking incidents. In confirmation of this assurance, I add the following outline of the latter part of their travels in Brazil. The fatigues that they had to endure in the sequel of their expedition having brought on severe illness, they rested for a time in the capitania of Maranham, whence, as soon as they were sufficiently recovered, they proceeded to the island of St. Louis, and after a six days' voyage by sea, from that place, landed at Para. Having at length reached the banks of the majestic and immense river of the Amazons, bounded by a lofty and evergreen forest, they had attained the chief object of their wishes; and setting out on the 21st of August, 1819, proceeded along the bank of the stream (amidst a chaos of floating islands, falling masses of the banks, immense trunks of trees carried down by the current, the cries and screams of countless multitudes of monkeys and birds, shoals of turtles, crocodiles, and fish, gloomy forests full of parasite plants and palms, with tribes of wandering Indians on the banks, marked and disfigured in various manners, according to their fancies,) till they reached the settlement of Panxis, where, at the distance of 500 miles up the country, the tide of the sea is still visible, and the river, confined to the breadth of a quarter of a league, of unfathomable depth. They then journeyed to the mouth of the Rio Negro. From this place every thing becomes more wild, and the river of the Amazons resumes its ancient name of Solimoës, which it had from a nation now extinct. The travellers had chosen the most favourable season of the year, when the numerous sandy islands, which are at other times covered, rising above the now low water, invited the inhabitants of the surrounding tracts, who piled up in heaps the new-laid turtles' eggs, out of which, by the aid of water and rum, they prepared the finest oil.

At the town of Ega on the Rio Teffe the two travellers separated. Dr. Martius proceeded up the collateral stream, the Japura, overcame, by the most painful exertions, the cataracts and the rocks on the river, and at length arrived at the foot of the mountain Arascoara, in the middle of the southern continent, separated from Quito only by the Cordilleras. Dr. Spix proceeded up the main stream, crossed the broad rivers Jurua and Jurahy, and the Spanish river Iça, and penetrated at length, through clouds of poisoned arrows discharged by the Indians, and of venomous insects, through contagious diseases, and threatening mountain torrents, to the mouth of the river Jupary, at the last Portuguese settlement of Tabatiaga, on the frontiers of Peru, where he heard the language of the Incas. Had the two travellers prosecuted their enterprise, a few weeks longer, they would have reached the opposite shores of the South American continent. But to effect this they needed the permission of the viceroy of Peru, and the time allowed them for their journey, would not permit them to extend it further. They again turned to the east, and the stream carried them down so rapidly that they arrived in five days at the place, from which it had cost a full month's exertion to work their way up the river. After several lateral excursions, which amply repaid their labour, they again reached Para on the 16th of April 1820. The object of their mission was completed: the continent had been traversed from 24° south latitude to the Equator, and under the line, from Para to the eastern frontier of Peru; an incredible store of natural treasures, and of curious information had been acquired. It is a most gratifying circumstance that all their collections, without a single exception, have arrived safe, and in perfect preservation at Munich, where His Majesty the King of Bavaria has had them all scientifically arranged, according to the several divisions of the animal, vegetable, and mineral kingdoms, in a noble building fitted up expressly for their reception, under the appropriate name of the Brazilian Museum, of which the indefatigable travellers, to whom it owes its existence, are most deservedly appointed conservators.

With respect to the translation, I do not feel it necessary to say more, than that it has been executed with all the care that I could bestow upon it, and that in the whole of the mineralogical part, especially the notes, I have had the assistance of one of the ablest mineralogists in the kingdom, to whom, though I do not feel myself authorised to mention his name in this place, I cannot refrain from returning my acknowledgments for the additional value which the work has derived from his liberal assistance.

H. E. LLOYD.

London, March 1824.

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DESCRIPTION OF THE PLATES

IN

THE FIRST VOLUME.

VILLA VELHA .... *Frontispiece.*

A village consisting of scattered houses, a league to the south-west of the Villa do Rio de Contas in the interior of the capitania of Bahia. The grotesque mica-slate mountain, Serra do Rio de Contas, or de Brumado, forms the back-ground of this luxuriant landscape. In the foreground are palms, calabash and gum anime trees (*Carica*, Papaja, and Hymenea Courbaril); and negro slaves are employed in gathering cotton.

A BOTOCUDO and A COROADO ...... *To face page* 143.

We are obliged to His Serene Highness Prince Maximilian of Neuwied for this portrait of a Botocudo.

The Coroado is the portrait of our attendant, Custodio, who accompanied us on a great part of our journey through the interior. *See Vol. II. page* 264.

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The farm of M. Von Langsdorff at the foot of the Serra de Estrella, the continuation of the Serra dos Orgaos; on the north side of the bay of Rio de Janeiro, and on the road to Villa Rica, the capital of the capitania of Minas Geraës.

DESCRIPTION OF THE PLATES.

A MAMELUCA and A CAFUSA .... *To face page* 316.

The Mameluca is a woman of the lowest class in the province of S. Paulo, descended from a father of the European, and a mother of the American race. The goitre is frequent in many parts of this province, and is almost considered as an ornament.

The Cafusa is likewise a female of the lower class in the province of S. Paulo. The Cafusos are a middle race, between the American and the Negro. The smooth hair of the former and the wool of the latter are modified in their mixed descendants into a high curly kind of peruke. The custom of smoking is general in this province, especially among the lower classes. *See page* 324.

TRAVELS IN BRAZIL.

BOOK I.

CHAPTER I.

PREPARATIONS FOR THE VOYAGE. — DEPARTURE FROM MUNICH; JOURNEY BY WAY OF VIENNA TO TRIEST.

AMERICA, which was unknown to us till within a few centuries, has, from the time of its discovery, been the object of the admiration and the regard of Europe. The advantages of its situation, the fertility and diversified riches of its soil, held out equal attractions to the European colonist and merchant, and to the scientific inquirer. This new country was rapidly peopled, and unfolded to our view, by the active intercourse with the mother country, and by the exertions of the learned men, who, animated by a laudable emulation, endeavoured to make themselves acquainted with it by extensive journeys into the interior. In this respect we are infinitely indebted to many enterprising travellers of former times, but more particularly to those of the last half century, through whose immortal labours America has been more successfully explored than any of the continents of the Old World, Europe alone excepted. Notwithstanding, however, the great advances we have made in our acquaintance with this part of the world, it still offers so wide a field for research and discovery as would greatly extend the sphere of human knowledge. This observation is peculiarly applicable to Brazil, the heart of this new continent; and which, although it is the most beautiful, and most richly endowed portion, has been hitherto but thinly peopled and imperfectly known.

His Majesty the King of Bavaria, the generous patron of the sciences, sensible of the advantages which would accrue to them, and to the interests of mankind in general, from a more accurate knowledge of America, directed the Academy of Sciences at Munich, about the end of the year 1815, to draw up, and lay before him, a plan for a literary tour into the interior of South America. Among others selected for this expedition, were the two academicians, authors of the present narrative, Dr. Spix for zoology, and Dr. Martius for botany. The original plan was, to proceed from Buenos Ayres, by land, to Chili; thence to travel northwards to

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Quito; and to return by way of Carraccas or Mexico to Europe.

Some difficulties, however, presented themselves, which obliged His Majesty's government to defer the execution of this project. But His Majesty's wish for the fitting out of this expedition being again revived, the marriage of Her Imperial Highness Caroline Josepha Leopoldina, Archduchess of Austria, with His Royal Highness Don Pedro D'Alcantara, Crown Prince of Portugal, Algarve, and Brazil, presented the most favourable opportunity for gratifying it. At the time of the conclusion of this alliance, which was to unite Europe more closely with the New World, His Majesty the King of Bavaria was at Vienna in person; and the Imperial Court having resolved to send some scientific men to Brazil, in the suite of the august bride, the king made arrangements for some members of his academy to accompany the Austrian expedition, with the same views towards the advancement of knowledge. The flattering choice fell upon us; and we accordingly received on the 28th of January, 1817, directions to repair, without loss of time, to Vienna, and thence to Triest; there to embark on board the frigates, which were already equipped for their voyage, to Rio de Janeiro. The Royal Academy of Sciences, at the same time, received orders to furnish us with instructions, not only respecting the principal departments with which we were specially charged, but also, generally, relative to all that might fall within the sphere of our observations and researches, and to provide us with those instruments, the judicious employment of which, during the course of the expedition, might be productive of results particularly interesting to science.

In consequence of these commands, the travellers were recommended to direct their chief attention towards enriching the two departments of zoology and botany, and at the same time to keep in view the other branches of science, as far as time and circumstances should allow. Dr. Spix, as zoologist, engaged to make the whole animal kingdom the object of his observations and labours. With this view he had to observe the inhabitants, whether aborigines or colonists; to remark the different effects of climate upon them; their physical and intellectual powers, &c.: the external and internal conformation of all the indigenous animals; their habits and instincts, and the geographical limits in which they are found; their migrations: and, lastly, to investigate the fossil remains of animals, those most authentic records of the past, and most convincing proofs of the gradual development of the creation. Dr. Martius, as botanist, undertook to explore, in its whole extent, the vegetable kingdom of the tropics. Besides the study of the botanical families peculiar to the country, he was particularly to examine those forms which, by their affinity or identity with those of other countries, lead to conclusions respecting their original country, and their gradual diffusion over the surface of the globe. He proposed connecting these researches with climatic and geognostic observations; and to this end to extend them to the most insignificant members of the vegetable kingdom, such as mosses, lichens, and fungi. He was likewise to observe the changes which both the native and exotic plants undergo, when exposed to certain external influences; and to investigate the history of the soil, and the method of cultivation there in use. An examination of the internal structure, and of the development of tropical plants, promised interesting solutions of the laws of vegetable life in general, as the observation of any traces that should be discovered of an earlier vegetation, now extinct, might afford materials for the foundation of a geognostic theory. Lastly, he conceived he should promote the object of the mission by an accurate investigation of the Brazilian materia medica, drawn from the vegetable kingdom, as well as of all other vegetable substances, the use of which might be interesting to arts and manufactures, and by carefully indicating the manner in which they are employed in their native country. But besides the observations and researches in the departments peculiar to each professor, in which reciprocal assistance and support were presupposed, they were particularly enjoined to complete, as far as possible, the collections of the academy, by sending specimens of all the natural productions of the several kingdoms, as the best certificate of the observations made.

In addition to these instructions, each particular branch of study at the university had its peculiar claims upon the industry and observation of the travellers. With respect to mineralogy, they were instructed accurately to observe the geognostic relations in which the different formations of the mountain masses in general stand to each other; their succession, magnitude, thickness, and particularly their dip; and, farther, to examine the hitherto problematical production of gold, of diamonds, and other precious stones, as well as of all the more important fossils. In physics, they were to observe the declination and inclination of the magnetic needle; its daily variation; the phenomena of electricity, according to the several degrees of latitude and longitude; the transparency and colour, the phosphorescence, temperature, and saltness of the sea in different regions, and at various depths; the temperature of the atmosphere; the phenomenon of the *Fata Morgana;* the mean temperature and the differences of climate in various parts of the continent; the periodical oscillation of the barometer; the different elevations of the ground; the traces of the gradual receding or advancing of the sea, on the coasts; the currents, the local anomalies in the tides; the electricity of the fish, &c. The historical and philosophic-philological classes of the university recommended attention to the different languages, national peculiarities, religious and historical traditions, ancient and modern monuments; such as writings, coins, idols, and, in general, whatever might throw light on the state of society, and the history both of the aboriginal and other inhabitants of Brazil, or which concerned the topography and geography of that hitherto so imperfectly known country. In order to satisfy, to the utmost of their power, these duties and wishes, the two travellers exerted themselves to provide every requisite for so great an enterprise, and to make, without loss of time, the necessary preparations. After every thing possible was got ready, and the books, instruments, medicine chest, and other travelling equipage, sent off direct to Triest, they set out from Munich on the 6th of February, 1817, for Vienna.

In this imperial capital, where they arrived on the 10th of February, they were favoured with the most active and generous support, by His Highness Prince Metternich, and by His Excellency Baron Von Stainlein, the Bavarian ambassador, in the further preparations, and in collecting what was necessary to accomplish the scientific objects proposed by the enlightened sovereigns. M. Von Schreibers, director of the Imperial Museum of Natural History, — as honourably distinguished in the learned world by his writings, as amiable in private life, to whom the organization of the Austrian scientific expedition to Brazil was confided,—had the goodness immediately to introduce them to the learned gentlemen selected by the Austrian government, who were to be their fellow travellers. Professor Mikan, from Prague, was appointed for the departments of botany and entomology; Mr. Pohl, M. D., for mineralogy and botany; Mr. Natterer, assistant in the Imperial Museum of Natural History, for zoology; Mr. Th. Ender, to be landscape painter; Mr. Buchberger, botanical painter; and M. H. Schott, son of the worthy superintendent of the University Garden, to be gardener; the two last were assigned as assistants to professor Mikan: there were besides with the company a huntsman and a working miner.

Rejoiced at the acquaintance with our future companions, we longed for orders to set out together for Triest. But as several circumstances left it doubtful when the two Austrian frigates would sail, we employed the time that we had remaining, partly in further preparations for the voyage, especially in procuring maps and other things which could not be purchased in the New World, or only at a very great expence, and partly in visiting the learned men residing in the capital. Among these were the venerable Baron Von Jacquin, the Nestor of German botanists (since unfortunately dead), who had himself passed many years in the West India islands, and on the Terra Firma, with such great advantage to science, and whose counsels were extremely welcome to us; his worthy son; Messrs. Prohaska, Trattinik, Host, Portenschlag, Bredemeyer, Prechtl, Meissner, &c.; all of whom testified great interest in our enterprise. But what particularly animated our courage and enthusiasm was the personal acquaintance of M. Ferdinand Bauer, the painter, who had accompanied Captain Flinders on his voyage in the South Sea and to New Holland, and was then actually engaged in pourtraying the strange forms of plants and animals of those remote regions.

We left Vienna on the 4th of March to repair to Triest. At Grätz we visited the Johanneum, founded by His Imperial Highness the Archduke John of Austria. This excellent institution is chiefly designed for the propagation of practical knowledge in the departments of natural history and the arts, and is a noble monument of the esteem of its princely founder for the sciences. On this occasion we became acquainted with the professors Chrys. V. Vest and M. Fr. Mohs, and if our time had permitted, would willingly have explored the beautiful environs of the capital of Styria, in company with those able enquirers; but circumstances were imperious, and we hastened away to visit the quicksilver mines of Idria. We thought it would be very interesting to obtain by personal inspection, a knowledge of those mines, the produce of which must prove of incalculable benefit to Brazil, rich as it is in gold, when the importance of amalgamation shall be understood there as well as it is in Peru and Mexico.

From Laibach, the residence of the aged and venerable Baron Von Zoys, who is still ardent in the study of natural history, and in possession of an admirable collection of the minerals of the country, we proceeded to Idria, which lies two posts to the side of the high road. The way, after many windings, leads into an extremely deep valley, in which the little town is situated. We passed some days there, in examining the curious formation of the slate clay, which forms an extensive bed in compact limestone, of the rich hepatic mercurial ores, especially the coral ore, which represents concentric lamellar, roundish concretions, resembling petrified bivalves, and, lastly, of the extensive smelting-houses, which for many years have furnished annually three thousand quintals of quicksilver. Returning to the high road, we visited, near Adelsberg, the caves in what is called the cavern limestone, in which are found not only loose skulls and other human bones, together with rosaries, but also remains of animals resembling the tapir, imbedded in the limestone. We were very desirous of visiting the neighbouring lake of Zircknitz, famous for its rising and falling; but the object of our journey required haste, and we set out immediately, after having by a fortunate chance obtained eighteen living specimens of the *Proteus anguinus* which is found here. As it is not yet fully decided whether this animal, which in its structure is between lizards and fishes, is only a larva or a perfectly developed animal, we took half of those we had procured to the torrid zone alive, in order, if possible, to promote their metamorphosis by the greater heat; the other half we sent to the Royal Academy at Munich, that they might be duly examined. Our road led us over the declivity of the Julian limestone alps, on which many masses of rock containing petrified shells lie scattered about, down to the fine seaport of Triest, where we arrived on the 10th of March. From the heights at Obczina, we had a noble view of the Adriatic Gulf, extending between the Italian and Istrian coasts; and saw the two Austrian frigates, whose masts rose above all the rest, lying at anchor, ready to sail.

The situation of Triest, the capital of Illyria, on the Adriatic, renders it one of the most important seaports of Italy for the Levant trade. The old town is built along the declivity of a mountain, on which the castle stands; the new town on the sea shore; the latter consists of some handsome streets with large houses, on a canal, by means of which the merchants' goods are conveniently brought from the sea to the interior of the town. The inhabitants are partly of Greek, Illyrian, and Italian, but principally of German origin. The market, amply furnished with the finest southern fruits, as well as the rarest productions of the sea, proves, by the union of the produce of the north and of the south, the happy situation of the city. Though a high mountain rises near it, and that on the north side, the harbour is not sufficiently protected against winds, and the cold is sometimes severe. The warm sirocco, which often blows over from Africa, is very relaxing, and frequently brings on diseases. At the time of our arrival the vegetable world was almost dead, and excepting *Helleborus hyemalis*, *Crocus reticulatus*, and *Primula acaulis*, we found on the bare ground scarcely a sign of the approaching spring. The sea, however, afforded a more ample supply of animals and marine plants; which, with the collections made on our way hither, and the insects which we obtained from naturalists here, were sent to the cabinet of natural history at Munich.* A painful sensation was excited in us by the information which we received, some days after our arrival, that the room which we occupied in the hotel where we put up, was that in which Winkelmann met his death from the hand of an assassin. We were here neighbours to the commander of the two frigates, Signor Nicola de Pasqualigo, a noble of Venice; a seaman, as much distinguished by general information and nautical knowledge, as by his courage and resolution, of which he gave proofs in the last war. He immediately took us to our future quarters on board the Austria frigate, which, as well as the Augusta, was built and equipped in the arsenal of Venice, and were destined by the Austrian government to receive on board the greater part of the extraordinary embassy, and of the legation to the court of Brazil, the members of the scientific expedition, and some agents for the commercial intercourse to be opened with Brazil, as well as the Austrian mercantile articles intended for that purpose. Some of the officers and crew were Germans, but the greater part Venetians.

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* See Note, page 17.

Every thing was ready for sailing, and we too had completed all our preparations, when news was received that it would be above a week before the embassy would arrive. We resolved, therefore, before we quitted our native land, to view the treasures of art at Venice. A favourable opportunity for this plan was offered by the return of an imperial brig to Venice, which had brought from the arsenal some stores necessary to complete the equipment of our two frigates. We sailed in the night of the 25th of March, and in the morning were already at the entrance of the harbour of Venice. The sea ran high, and the motion of the vessel did not fail to produce in us the usual symptoms of sickness; we were therefore doubly rejoiced when we had passed the dangerous entrance, and felt ourselves upon terra firma in the square of St. Mark. In order to make ourselves acquainted with the city, we rowed in one of the black gondolas in use here, through the labyrinth of canals, to those noble buildings which remain as monuments of the time when Venice, in possession of the sovereignty of the Mediterranean, brought to the markets of Europe all the treasures of the East. Its present state bears testimony to the instability of all human splendour. But every thing great and glorious that the commerce of the world could produce, is preserved in the architectural monuments in the square of St. Mark; which the art of Tintoret, Paul Veronese, and Titian, by their warm and vivid colouring, adorned, in the decline of the republic, like the parting beams of the setting sun.

From the top of St. Mark's we enjoyed the delightful prospect of the plain of Lombardy, stretched out between the Alps and the Appennines, and so richly adorned with cities and universities. A view of this country involuntarily calls to mind the immortal poets and artists whom its romantic natural beauties have inspired, and fills the soul of the observer with the most pleasing and sublime sensations. In us it excited a wish, to see at least the neighbouring city of Padua, and its once celebrated university. Half a day's journey brought us to that antique place, where we had the pleasure of becoming acquainted with professors Brera, Caldani, and Bonato. In the botanic garden, which formerly, under Guilandinus, so greatly contributed to the reputation of the university, we were struck with some trees, originally brought from the East, and which have now grown to a large size; viz. *Laurus Borbonia, L. Benzoin, L. Sassafras, Liquidambar Styraciflua, imberbe, Pinus Cedrus, Acacia Julibrissin,* which continue to flourish, in undiminished verdure, monuments of the former glory of Venice. But beyond the limits of this garden, the country, at this season, was still dry and bare; only a few liliaceous plants, such as *Hyacinthus racemosus, Erythronium, Dens Canis, Scilla bifolia, Crocus reticulatus,* adorning the naked limestone hills. With this excursion the time of absence allowed us expired, and it was necessary to think of returning to Triest. The wind, since our arrival at Venice, had blown so steadily from the north, that, to ensure our not being too late, we resolved, instead of going by sea, to proceed by land, by way of Treviso, to Triest, which we reached safe after an agreeable journey of two days.

Some members of the legation and some of the naturalists had arrived meantime at Triest, and the remainder came the following day; so that our births on board the frigates were assigned us, the baggage embarked, and the whole company took up their quarters on board, on the 7th of April. Baron Von Neveu, counsellor of legation, who was afterwards to be chargé d'affaires at the court of Brazil, had the sole direction of the expedition; because the ambassador, Count Von Eltz, was to embark afterwards, with the august bride, at Leghorn. He had with him Count Von Schönfeld, and Count Von Palffy, as gentlemen of the embassy. All three were on board the Austria, as well as the commander of the two frigates. Quarters were assigned on board the same vessel, to professor Mikan and his lady; the two Bavarian naturalists, Spix and Martius; the Austrian landscape painter Th. Ender; M. Weber, merchant of Triest; and to M. Nerini, Austrian consul-general at Cadiz, who took the opportunity of this conveyance to Gibraltar. The Augusta frigate took on board the Austrian naturalist, Natterer; the gardener, Schott; the botanical painter, Buchberger, with some assistants; a mercantile commissioner, and his secretary. The command of this vessel was given to lieutenant-colonel Agurti. The Austrian mineralogist Pohl, and the animal painter Frick, were to make the voyage on board a Portuguese vessel. Count Von Wrbna was to proceed from London to Brazil, to bring thither the first news of the celebration of the marriage by proxy. The two frigates were ordered to sail in company to Gibraltar, there to wait for the Archduchess; who, with her retinue and the embassy, was to embark on board a Portuguese squadron ordered to Leghorn. As soon as all the travellers were on board, and the preparations entirely completed, the governor of Triest visited the two frigates, each of which had forty-four guns, and a crew of 260 men, inspected the crews and the cargoes, and then, with the most ardent wishes for a happy voyage, and amidst the thunder of artillery, took his leave.

NOTE TO CHAPTER I.

Aves: *Larus* cyanorhynchus, minutus; *Anas* fuligula, acuta, fusca, Tadorna; *Hæmatopus* ostralegus; *Totanus* ferrugineus; *Numenius* phaeopus, arcuatus; *Ardea* minuta. Pisces: *Squalus* Zygæna, Acanthias, Catulus, centrinus, glaucus, Squatina; *Raja* Torpedo, R. torp. nigromaculata, Rubus, clavata, spec. nova, *trunco subtriangulari, mutico, supra cinerascente, subtus albo, cauda tenui, longissima, inermi, pinna unica supra ad radicem caudæ; Accipenser* Sturio, ruthenus; *Syngnuthus* Acus, Hippocampus; *Lophius* piscatorius; *Muræna* Anguilla; *Uranoscopus* scaber; *Blennius* viviparus; *Cottus* Scorpius; *Scorpæna* horrida; *Zeus* Faber; *Pleuronectes* hippoglossus, maximus, Solen, Flesus; *Sparus* Sargus, auratus; *Scarus* et *Labrus*, div. spec. *Lutianus* Linkii; *Trigla* Cuculus, Hirundo; *Scomber* Thynnus, trachurus; *Mugil*, n. sp. Mollusca: *Loligo* octopus; *Aplysia* depilans, fusca; *Ascidia* mentula, conchylega, n. sp. *vesiculosa, appendicibus numerosis; Thetis* coriacea. Conchyl. Patella sanguinea; *Fissurella* græca; *Murex* Haustellum, Brandaris; *Turbo* rugosus; *Strombus* Pes pelicani; *Turritella* Terebra; *Pholas* costata; *Cardium* rusticum; *Pecten* jacobæum; *Pectunculus* pilosus; *Tellina* Remies; *Arca* Noæ; *Solen* Vagina; *Anomia* Cepa; *Pinna* nobilis, pectinata. Crustacea: *Astacus* marinus, norwegicus; *Mantis* Squilla; *Maja* Squinado; *Cancer* Mœnas, spinifrons; *Dromia* Rumphii; *Portunus* Depurator; *Oniscus* Armadillo, Asellus; *Scorpio* italicus. Insect. Eleutherata: *Scarabæus* stercorarius, sylvaticus, autumnalis; *Sisyphus* Schaefferi; *Copris* lunaris, emarginata; *Oniticellus* flavipes; *Onthophagus* Taurus, austriacus, nuchicornis, Xiphias; *Aphodius* fimetarius, Fossor, Scrutator, fœtens; *Hister* 4-maculatus, politus; *Necrophorus* Vespillo, mortuorum; *Cetonia* florentina, marmorata, obscura, hirta,

aurata; *Trichius* hemipterus; *Carabus* catenatus; *Chlænius* festivus; *Staphylinus* hirtus, olens, erythropterus; *Buprestis* læta; *Cantharis* fusca, melanura, nigricans; *Malachius* æneus, bipunctatus; *Blaps* obtusa, spinimana; *Tenebrio* obscura; *Rhingites* populi; *Curculio* cribrosus, sulcirostris; *Pachygaster* goerzensis, gemmatus; *Cerambyx* moschatus; *Lamia* funesta, tristis; *Callidium* luridum; *Dorcadion* pedestre, rufipes; *Donacia* semicuprea; *Galleruca* rustica; *Chrysomela* ænea, Adonides, populi, coriaria; *Clythra* longimana; *Panagæus* Crux major; *Cryptocephalus* auritus. Rhyngota: *Ligaeus* equestris, apterus; *Coreus* marginatus; *Cydnus* violaceus; *Cimex* brassicæ; *Cercopis* fasciata, sanguinolenta; *Parnops*, carnea. Verm. annul.: *Aphrodite* aculeata; *Holothuria* pendactes, elegans. Asteroid.: *Asterias* aurantiaca, membranacea, rubra; *Ophiurus* ciliatus, Caput Medusæ; *Echinus* edulis. Zoophyta: *Medusa*, *Actinia*, div. sp.; *Alcyon* exos, Ficus, pulmonarius; *Spongia* cannabina. Plantæ Marinæ: *Fucus* vesiculosus, L. et var. spiralis, L., obtusus, Turn. mucronatus, T., ovalis, T., ericoides, T.; *Sphærococcus* Teedii; *Chondrus* crispus, laceratus; *Zonaria* Pavonia; *Ulva* purpurea; *Lactuca* Linza; *Cystoseira* (Halidrys Lyngb.) siliquosa, Ag., Hoppii, Ag., ericoides, Ag.; *Sporochnus* rhizodes, Ag.; *Plocamium* coccineum; *Gelidium* pinnatifidium, gigartinum; *Gigartina* plicata, purpurascens; *Scytosiphon* fistulosus, compressus; *Cladostephus* hirsutus, verticillatus; *Sphacelaria* aciculata, scoparia; *Hutchinsia* violacea, stricta; *Ceramium* elongatum, rubrum, diaphanum, ciliatum; *Callithamnion* coccineum, fruticulosum, corymbosum; *Ectocarpus* siliquosus; *Conferva* fructa. (The greater part determined after Lyngbye; a few after Agardh.)

CHAPTER II.

DEPARTURE FROM TRIEST. — VOYAGE IN THE ADRIATIC AND THE MEDITERRANEAN TO GIBRALTAR.

On the 10th of April, at two o'clock in the morning, our vessels weighed anchor, and in the silent darkness of the night quitted the harbour. The sea was calm; and the wind blowing moderately from the north, we made four or five Italian marine miles in an hour. When the company met on deck at sun-rise, the mountains of Friaul were already visible in the hazy distance. The greater part of our company, who had never been at sea before, remained on deck the whole day, and in the mingled feeling of regret and pleasure, which the departure from home excites, fixed their eyes on their native land, as it seemed gradually to recede from their view, till the increasing motion of the ship, and the raw cold wind that swept towards evening over the darkening surface of the sea, compelled the greater number to retire to the cabin. The night passed over quietly; but in the morning we were all awakened from our sleep by an uncommonly violent motion of the ship. Those whom sea-sickness had not rendered insensible, readily perceived, from the tossing, cracking, and rolling of the ship, which struggled with the foaming sea, — from the creaking of the masts, the roaring of the wind, the cries of the sailors running backwards and forwards, and the whistling of the boatswain's pipes, that we were in a great storm.

The Bora, a cold, very violent north-east wind, which, especially in spring, frequently blows from the Istrian mountains, and prevails in the northern part of the Adriatic sea, had suddenly assailed the two ships. A black cloud, hanging very low, was the only indication that the officer on duty had of the approach of the gale; so that there was scarcely time to take in the sails. In a few minutes we lost sight of the Augusta, which hitherto had kept at a small distance from us. A thick fog enveloped our ship; a cold rain, mixed with hailstones, which the storm furiously drove before it, covered the deck with pieces of ice of considerable size, and almost froze the crew. The ship was tossed violently; the yards and tackle were torn and broken; the waves rushed through the window into the forecastle, partly filled the hold with water; and at last, when the storm was at its height, the bowsprit broke short off. The hurricane raged with the utmost fury till noon, when the sea grew calmer, and the bleak Bora being succeeded by a mild east wind, we cast anchor in the middle of the sea, about three miles to the west of Rovigno. In this situation we awaited the break of day, all hands being meantime busily employed in repairing the damage that had been done, especially among the cordage, which had suffered by the breaking of the bowsprit. The fine library of Baron Von Neveu was overflowed by the waves, which had beat in the windows of the great cabin, and almost all the travellers had sustained some damage by this furious storm; yet, being now in safety, we were less concerned about our own misfortunes than about the fate of our consort. The passengers, to whom this first trial had been very severe, gradually assembled on the deck, where the view of the great damage so suddenly occasioned, and of the exhausted crew, who were benumbed with cold, completed the impression of the extent of the danger from which we had so providentially escaped.

The gloomy sky having cleared up a little, the ship began to proceed slowly towards the south-east. At noon we descried the arid coasts of Istria, on which the sun, just then breaking from the clouds, threw a light strongly contrasted with the darkness of the other parts of the scene. At this moment no sight could be more welcome to us, than that of what might be called a part of our own country. We sailed past the little islands covered with the olive and phillyrea, which lie at the entrance of the harbour of Pola, and anchored near the town. The passengers went on shore the same evening to enjoy the sight of the fine Roman antiquities which render this country so interesting. The greatest ornament of this poor little town, which contains scarcely a thousand inhabitants, (though in the time of the Romans it ranked next to Ægida now, Capo d'Istria, the most important place in Istria,) is the circus. It has three stories, each of seventy-two arches, and is one of the best preserved monuments of this kind, which is principally owing to the material of which it is built; a solid, fine-grained limestone. The temple, which the city of Pola dedicated to Rome, under Cæsar Augustus, in a chaste and noble style, with a propylæum of the Corinthian order, is not so well preserved. The porta aurea, a triumphal arch, with columns of the Corinthian order, now serves as a gate to the town.* The Venetians, after they had separated Pola, and many other seaport towns of Istria and Dalmatia, from the dominions of the kings of Hungary, erected a fort here, with four bastions, which, however, is now in ruins. From it there is a fine view of the harbour with its verdant islands, of the town and the colossal amphitheatre, which rises above pleasant groves of olives and laurels.

While our frigate was under repair, we had leisure to make several excursions in the environs of

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* Voyage pittoresque et historique de l'Istrie et Dalmatie, rédigé d'après l'itinéraire de L. F. Cassas, par Joseph Lavallée. Paris, 1802. fol.

Pola, which made us better acquainted with the interesting peninsula of Istria. The mountains, which run from north to south, consist, like the other parts of the country, of floetz lime-stone, and are of the same formation as the *Karst*, that desolate ridge of mountains, remarkable for its rugged clefts, which runs, several leagues in breadth, from the district of Gorz, in the direction from W. N. W. to E. S. E., to the shores of the gulf of Fiume, and thence southwards to Croatia. Large and small caverns and vesicular cavities, holes, and ravines, which frequently give the mountain the appearance of having been washed by the rains; petrifications, such as *Ammonites*, *Gryphites*, *Terebratulites*, which, however, are not so common in the Istrian peninsula as on the continent, and in the islands of the Golfo di Quarnero, a compact fine grain, large conchoidal fracture fragments, indeterminately angular and sharp-edged, absence of metal, and a whitish-yellow or reddish-grey colour, characterise this lime-stone, which constitutes the chief formation, not only of the peninsula, but of all the islands in the gulf of Quarnero, and of the mountain chain in the north of Croatia. It is said that there are in the peninsula, especially in the northern part, several large caverns which have never been explored, an accurate investigation of which might afford interesting results respecting the fossile remains of animals found in the islands of Osero and Cherso, and still more abundantly in Croatia. About Pola itself the limestone is without those fossile bones, indeed almost without petrifications; and towards the sea, where it is inhabited and perforated by innumerable mytili, frequently shews almost horizontal strata from two to three feet thick. In general, only a little mould lies over it. In former times, the great stone quarries of Pola and Pirano furnished materials for building the proud palaces of Venice.

The vegetation of this dry and rocky soil is by no means luxuriant. The charms of the south European Flora, to which that of Istria belongs, do not consist in those thick and lofty forests, those verdant pastures and rich meadows, that distinguish the north. On the contrary, we are surprised at the nakedness of the hills, and of the plains, destitute of trees, with hardly any thing growing on them but juiceless shrubs; and, lastly, by the want of general cultivation. The *Phillyrea latifolia*, *Erica arborea*, *Buxus sempervirens*, *Cistus Ledon*, *C. salvifolius*, *Juniperus Oxycedrus*, *Pistacia lentiscus*, *Smilax* and *Arbutus Unedo*, form low, shadowless, dry clumps, which cannot bear a comparison even with our dry pine forests; but the many plantations of olives and laurels have an appearance of softness and lustre, which corresponds with the mildness and transparency of a southern climate. This great transparency, and the beautiful azure of the sky, were observed by us with pleasure in some sun-shiny days during our stay, as infallible indications of more favourable weather, and of the approach of spring; some of the harbingers of which, belonging to the vegetable kingdom, were already in full bloom; such as *Anemone hortensis, Parietaria judaica, Plantago subulata* and *Coronopus, Ornithogalum umbellatum, Muscari comosum* and *racemosum, Ixia Bulbocodium, Ranunculus muricatus* and *parviflorus,* and some others. The season being still so cold, hardly any animals were to be found except a *Testacella Europæa,* the *Scorpio Italicus,* and the more common marine animals, such as *Aplysia depilans, Holothuria elegans,* some fish and medusæ.

The meteorological phenomena here were not very different from those observed at Triest. The barometer was at 27° 11′: Reaumur's thermometer in the air was, in the morning, never above 8°; at noon, 10°—11°; in the evening, 6°—7°: in the water, in the morning, 8°—9°; at noon, 9°—10°; in the evening, 8° to 8° 5′. The specific gravity of the sea water was 1.0372. The whalebone hygrometer stood between 39° and 48°.

The naval officer, who had been sent from Pola to Venice, to bring a new bowsprit from the arsenal, and make inquiry respecting the fate of our consort, the frigate Augusta, of which we could obtain no information on the solitary coast of Istria, returned in a few days, with the bowsprit, and the news that the Augusta, after losing all her masts, sails, and boats, had sought shelter in the island of

Chioggia, and would in all probability be obliged to go from that place to Venice, in order to repair in the arsenal of that city the great damage she had sustained, which was estimated at twenty thousand francs. The bowsprit was soon put up, and on the seventh day the Austria was again ready to sail. The embassy, therefore, resolved to proceed to Gibraltar alone, and there to wait both the Augusta frigate and the royal Portuguese squadron, as well as further instructions from the imperial court of Vienna.

On the 21st of April, at six o'clock in the morning, we weighed anchor, and left the harbour of Pola with a faint east-north-east wind. By the time it was broad daylight we were in the open sea. The horizon was covered with thin white clouds, but the sky in the zenith was of the purest azure, and we indulged in the most pleasing hopes as a faint but favourable wind conveyed us to the entrance of the Golfo di Quarnero. About ten o'clock in the morning we had the south east point of Istria before us, about ten leagues distant. We took a last look of the Monte Maggiore, the highest mountain in the peninsula, the summit of which had been covered with snow on the day of the storm, and was not yet free from it. When we had doubled this southermost promontory, the high mountains behind Fiume rose in the distant back ground to the north, and before us Il Monte d'Osero, a steep barren limestone chain, which runs lengthwise through the greater part of the island of the same name, and is a great advantage to navigation, as a mark in these seas, where there are so many rocks and shoals. In the afternoon we passed the island of Sansego. The wind now increased, so that during the whole night we never sailed less than five leagues in an hour by the Illyrian islands of Grossa and Coronata; and the following morning we were in the latitude of Ortona.

At sunrise we saw the island of St. Andrea; at noon, Brasso; and soon after, the Pomo, an insulated rock in the form of a sugar-loaf, with a beetling point on the north side; which was an agreeable sign to us of the rapid progress of our voyage. In the afternoon it was N. N. E. of us; and the larger island of Lissa, which concealed Lessina from us, appeared afterward, in the mist, to the north-east. All these islands still belong to the limestone formation of the Golfo di Quarnero. On the Italian coast we perceived the most southern promontory of the Garganus Mons, the Monte St. Angelo, which was covered with snow very low down, an appearance which agreed with the cold observed by us (the thermometer had never risen above 8° Reaumur). Manfredonia, the saline coasts of Salapia, and the mouths of the renowned Aufidus, in the neighbourhood of which Hannibal humbled the Roman pride, gradually vanished; while Cuzzola, Cazziol, Agosta, and then in the back ground Meleda, came in sight, as also the two rocks, Pelagosa, which stand in the middle of the sea, and are inhabited by innumerable flocks of gulls. We left the latter to the windward, and sailed between them and the Italian continent. The appearance of the sky had changed several times, and we had some showers; the wind, however, remained constant. Monopoli, and the long edge of the coast of Apulia, came in sight on the morning of the following day; and towards eleven o'clock we were in the vicinity of the ancient Brundusium. We clearly distinguished the sea-shore, which is covered with pines, the broad crowns of which are visible at a great distance. Two small forts seemed to us to lie to the north, and a third to the south of the town, which stands rather more in the back ground. Several watch-towers, built to observe the Barbary pirates, stand along the coast; memorials of a different age from that when Brundusium, the eastern station of the Roman maritime power, sent formidable fleets to sea, and kept Greece subject to Italy. Cicero's complaints, when, avoiding Rome, he came here to pass over to the Peloponnesus, and Cæsar's vast efforts when besieging his rival Pompey, rise before the mind of the traveller, on seeing this ancient maritime town. St. Cataldo and the mountains of Lezze became visible before we doubled Capo della St. Maria, the extreme point of Apulia, where, on the steep naked coast which stretched before us to the north-west, we could discover nothing but one solitary church. In this latitude, where we saw the islands of Merlera and Corfu to the south-east, in a grey mist, and nearer to us the mountain ridge of the island of Fano and the Montagne di Cimara, on the coast of Albania, which joins the higher chain of Pegola, the temperature remained higher the whole day than we had hitherto observed it. The thermometer stood in the morning, in the air, at 9° 50′, R.; in the water, 10°; at noon, in the air, 11° 75′; in the evening, in the air, 10°; in the water, 11° 75′. But the night during which we were in the gulf of Tarento, was again, however, remarkably cold. The horizon was enveloped in dark clouds; and we had frequent lightnings, succeeded by long-continued peals of thunder. The sea in the gulf of Tarento is often stormy and very dangerous, particularly for small coasting vessels. In the night of the 25th we doubled Capo Spartivento, the most southerly promontory of Italy, and with a fresh breeze from E. S. E. directed our course towards Malta. Thus our voyage through the Adriatic sea was happily completed; and we left behind us those countries in which, above all others, ancient and modern history are blended together.

The awfully majestic Etna soon came in sight: its snow-crowned summits were veiled in a thick fog. Soon after we beheld, on the Sicilian coast, about ten miles to the north of us, the renowned

Syracuse, the birthplace of Theocritus and Archimedes. With the assistance of our telescopes, we distinguished the walls and towers on the east side of the city, and the roofs of several of the principal buildings, which, indeed, seem to retain but little of the splendour of the opulent Syracuse, which Cicero describes as one of the most beautiful cities of antiquity. Recollections of the noble-minded Timoleon, — of the tyrant Dionysius, — of the grandeur and magnificence which Syracuse attained after the conquest of its rival Agrigentum, strike upon the mind of the observer.

The sea in this latitude, as well as in the gulf of Tarento, is of a light-green colour, which is principally owing to its inferior depth. As this colour changes according as the rays of the sun fall, it is hardly possible accurately to determine the various degrees of the blue, green, and grey colour; for the sea apppears in the same place of a much brighter hue when it is strongly illuminated by the sun, than when the horizon is overspread with dark clouds. It is in this place also that we first discovered the phosphorescence of the sea. It was, however, much fainter and more dispersed than we afterwards noticed it on the coasts of Spain, at Gibraltar, and in the ocean, and seemed to arise chiefly from minute mollusca.

The stormy weather had driven birds of various kinds from the Sicilian coast, which came and rested upon the frigate. We caught several turtle-doves, a small sparrow-hawk, a goat-sucker, sea-swallows, and fly-catchers; all birds which belong to the south European continent, and partly commence from hence their annual migrations over the sea. It is, perhaps, from this circumstance, that the neighbouring promontory of Sicily derives its name of Capo Passaro. The superstition of the Venetian sailors looked upon the doves as a token of a happy voyage: the goat-sucker, on the contrary, was pursued by them as a bird of ill omen, and it found no secure asylum on the rigging.

On the following morning we were already forty-two leagues to the west of Malta, when the wind suddenly settled in the N. N. W. It soon increased, and the waves ran so high, that it was impossible to keep the course to the south-west. The frigate rolled so violently, that in a short time the tackling was materially damaged; every thing movable was thrown backwards and forwards; and it seemed dangerous longer to expose the ship to the fury of the waves. As the wind besides threatened to continue, and the captain, taught by former experience in these seas, foresaw that perseverance would only cause delay, he resolved to put back to Malta, there to wait for a more favourable wind. After having been buffetted for some hours by the storm, we accordingly changed our course, and the wind being now in the right quarter, we speedily arrived off Malta, and sailed round the little and great Gozzo, and at two o'clock in the afternoon cast anchor in the fine harbour of Lavaletta. Scarcely had the frigate announced its arrival by the customary salute, when the lofty walls of the city were crowded with spectators; but this sight did not surprise us so much as that of a number of naked men, who were drying their clothes in the hollows of the limestone rocks next the beach. They were the crew of a vessel which had suffered shipwreck the preceding day in this harbour. We considered ourselves doubly fortunate in having escaped the danger which threatened us at the entrance into the harbour, and in being able to view this island, whose situation between Africa and Europe renders it so remarkable.

Lavaletta is one of the most glorious monuments of the Order of Saint John of Jerusalem, founded during the crusades, the grand masters of which from the time of Charles V. to the latest period, were established here, after having been driven from Palestine farther and farther to the west. This celebrated order was the fairest fruit of the ancient spirit of chivalry, and its members united by the Christian faith and heroic deeds for the security of Europe against the infidels, have founded in it a monument of general European civilization. The entrance into the harbour of Lavaletta excites admiration and surprise. At the sides of the narrow entrance, steep bastions and forts rise above the lofty limestone rocks, which present formidable rows of batteries towards the sea. Behind them a broad road leads up the rock to the city, the houses of which, with flat roofs, are built on terraces one above the other. The palace of the governor-general, in the highest part of the city, enjoys a fine prospect over the sea. It still contains many memorials of the order: among others, the portraits of the grand masters; the library of the order, which is said to be rich in ancient works in theology, antiquities, and jurisprudence; and the arsenal, in which there are many trophies taken from the infidels; also the small but very heavy armour of the noble grand master, Lavalette. The church of St. John, built on a small eminence in the city, in bad taste, and overloaded with ornaments, is particularly remarkable for its riches in Italian, Greek, and Oriental marble, as also in Egyptian porphyry and serpentine. The paintings, among which those of Matthew Preti, surnamed Il Calabrese, are the best, are chiefly by Neapolitan masters. The separate tongues of the order have their own chapels in the church, which, as well as the vault, contains many fine monuments.

From Lavaletta the way leads to Citta Vecchia, over naked fields, between innumerable little country-houses. The first thing shown to strangers here, in the old town, is the church of Saint Paul the Apostle, who, according to the Acts of the Apostles, suffered shipwreck in a place where two currents met, according to the tradition of the people, close to the island. Hence all the environs are looked upon by the inhabitants with religious respect. They likewise attribute to the circumstance which occurred upon the apostle's landing, the supposed absence of serpents in the island; contrary to which opinion, we must, however, confess that we saw a snake in the fields. The church of St. Paul is built in the modern style, but overloaded with all imaginable ornaments,—gilding lapis lazuli, and marble. Not far from the church is the grotto of St. Paul, where there is an image of the apostle as large as life. The stone, of which the cavern consists, supposed by the inhabitants to possess the miraculous power of curing all kinds of fevers, is a marl-like, light, white, brittle limestone, of recent formation, in which there are traces of petrifications of marine shells, still found in the adjacent seas, such as the *Mytilus esculentus*, and several species of *Cardium*. Though thousands of chisels have been at work upon this wonder-working rock, the pious credulity of the people cannot observe any diminution of it. We were not permitted to leave the old town without seeing the celebrated catacombs. The entrance to them is in a garden, very near the church of St. Paul. They are extensive intricate passages, hewn in the soft rock, sometimes only a few feet broad, and the height of a man, and sometimes widened into large vaults. Popular tradition ascribes them to the first Maltese Christians, who, to escape persecution, built a subterraneous town; and the inhabitants therefore fancy that they can distinguish the church, with the altar and the font, the dwellings of the families, with the kitchens, cradles, and tables, hewn in the rock. Others suppose them to have been the repositories of the wounded Christians brought hither during the crusades, or the burying-places of those who died in that period. They place their origin in an earlier age; and consider them to have been made partly to procure stones for building, and partly in conformity with the custom derived from the mother country, Carthage, and still practised in the time of the Romans, to dig such extensive receptacles for the dead. Those who hold this opinion consider the remains of bones sometimes found here to belong to that period.

Some traces still seem to remain in the features of the Maltese, of the affinity of Malta with old Carthage; or with the Moors, who possessed the island till they were expelled by the Normans. The yellow-brown complexion, — the lank black slovenly hair, and black beard, — the black oblong eyes, — high bushy eyebrows, which give them a malicious look, — sharp, but not disproportionately high cheek-bones, — the high, but blunt nose, — thick lips, — the slender, lean, and rather hairy body, seem to indicate partly an oriental origin, and partly an affinity with the Neapolitans and Sicilians. This oriental origin is remarkably confirmed by the peculiarity of the Maltese language, which essentially differing from the European, renders it difficult for the stranger to understand the Italian dialect of the common people, and according to the researches of modern philologists, seems evidently to resemble in its elements (both the words and the grammatical forms) the ancient Phœnician, and still more the Arabian.* The inhabitants seem also to resemble in activity and industry that ancient commercial people. The common people are employed in fishery, including the coral fishery, and also in navigation or in agriculture. The whole island is most carefully cultivated; and the grounds round the city, as well as round the numerous villages, bear the appearance of laborious industry. On every side you see fields surrounded with heaps of stones three feet high, on which the American cactus grows abundantly, and between them numerous stone country houses, not distinguished either for their size or architecture. In the spring the eye dwells with pleasure on the fresh generally diffused verdure; but in the height of summer, when only the moist valleys remain green, the island is said to have a desolate appearance. The ground does not rise into mountains, nor can woods grow in the thin coat of mould upon the rocks, which is often prepared, or fetched from a distance, with great labour.

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* Bellermann, Phœniciæ linguæ, vestigiorum in Melitensi Specim. I. Berol. 1809. Gesenius, Essay on the Maltese Language. Leipzig, 1810.

The most agreeable part of the island is the Boschetto, a small valley, cooled by the sea breeze, and watered by a stream, with an orange grove, which flourishes in all the luxuriance of southern vegetation. The adjoining country house, built in a chaste style, and belonging to the king, affords a delightful prospect of the sea and the environs. On our return from Citta Vecchia, we visited the country seat of Sir Thomas Maitland, near St. Antonio. We here saw a very fine African ostrich and a lioness, curiosities which are more common here, because the Maltese, as is well known, carry on a trade in live animals. His excellency's garden, which is laid out in the French style, extends on one side to the sea, and is adorned with many fine plants from the Levant and from the Cape, which thrive as in their native soil. Perhaps no part of Europe, even the most southern provinces of Spain and Portugal not excepted, affords a more favourable climate than Malta, for the establishment of a botanic garden, where all the productions of the vegetable kingdom might be successfully cultivated. For this reason the public garden of the city, which existed when the island was in possession of the order, is especially protected by the present government. It is under the direction of Fra Carlo Giacinto, a very obliging Carmelite, who communicated to us much interesting information.

He has paid much attention to the cultivation of fine kinds of fruit, and has published a book on the agriculture of Malta.* The superiority of the Maltese oranges is well known, and they are with justice esteemed the finest in Europe. We tasted some of these fruits in the garden of Sir Thomas Maitland, which might with propriety be called apples of the Hesperides. Citrons in the greatest variety, and the shaddock (*Citrus decumana*), are as common in the gardens as the carob tree (*Ceratonia Siliqua*); and fine stone fruit, which, though originally brought from the Caucasus and Pontus, yet attain the highest perfection under this almost African sky. This island produces a little wine, but far from sufficient for its own consumption; but they have fine Salernian, and the strong wine of the neighbouring island of Sicily. Besides the vegetables common in the north, the love-apple (*Solanum Lycopersicum*) is likewise cultivated. The Indian torch-thistle (*Cactus Ficus Indica*) and *C. Opuntia* are common in the gardens, and on the dry walls, and together with the aloe, impart to the landscape somewhat of a foreign appearance. The common people eat the fruit of the cactus, and the leaves are sometimes cut to pieces and given to the cattle. These leaves, which contain a great quantity of carbonic acid, are used at Zante, as an excellent remedy for the stone, and the fleet of

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* Saggio di Agricoltura per le Isole di Malta e Gozo. Messina, 1811, small 4to.

Admiral Collingwood took a stock of them salted among their provisions. In the sequel of this narrative, we shall have occasion to speak of the importance of these fleshy plants (which derive almost their whole nourishment from the air) to the inhabitants of some of the arid districts of Brazil, and show how necessity and experience direct the most remote nations, to make the same use of the productions of nature. Here, as in Calabria, a very durable and silky thread is made of the fibres of the American aloe. Instead of hay they use the *Sula* (*Hedysarum coronarium*), which is sown in fields, and is generally brought to market fresh, in bundles, for sale. This fodder would be preferable to our sain-foin, but seems not able to bear the German winter. A remarkable production of Malta is the *Fungus melitensis* *, a leafless fleshy plant, which grows parasitically at the roots of the trees on the sea-shore, and was formerly celebrated as a favourite remedy for the phthisis. The people regard the peculiar form of this plant as an evidence of its wonderful virtues, which, however, are not confirmed. Nay, the government itself formerly set a high value on this singular plant, and had it cultivated at Casal Bingli, not far from Boschetto, by two persons, each of whom received an annual salary of fifty scudi. We saw in the fields maize, oats, barley, buck wheat, and beans. The wheat is said to produce, in the worst soil, sixteen fold, and in the best sixty-four fold, a fertility which exceeds that of Sicily. Cotton too, which when spun is mostly exported to Spain, the carraway seed (*Cuminum Cyminum*, L.), and the aniseed (*Pimpinella Anisum*, L. *Sison Anisum*, Spreng.), all brought hither from the East, during the crusades, are much cultivated in Malta and the neighbouring Gozzos; one of which, the Lampas of the ancients, even bears the name of Comino from carraway (*Cuminum*). *

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* See Note 2. page 50.

In general the observer is every where struck with the proofs of the extraordinary care with which the industrious inhabitants take advantage of every spot, however small, that can be obtained from the rocky soil, which is almost entirely destitute of mould. Indeed, were it otherwise, this little spot, which does not much exceed six square miles in extent, would not be able to maintain a population of above seventy thousand souls. It is said, however, that the population has decreased since the island has been under the dominion of the English, especially of late years, both by the stagnation of commerce and by diseases. The situation of the island is indeed, on the whole, healthy; but the S.E. sirocco, which blows frequently during the summer and autumn, and in the short passage over the sea from the coast of Africa hither, cannot lose the malignant vapours with which it is impregnated, not only causes in most of the inhabitants an unpleasant sensation and great lassitude, but sometimes, when it is of long continuance, has still more pernicious effects on the body, producing great relaxation of the nerves, corruption of the juices, dysentery, putrid fevers, &c. The plague, which was brought in 1813 from Alexandria to Malta, and continued to rage nearly a whole year, carried off a great number of the inhabitants, especially of the lower class; and this distemper was found to be no less fatal here than in the Levant. Of the last hundred who were attacked, only four survived.* During our stay the thermometer was at 26° 00′ of Reaumur, which with a N.N.W. wind, we did not find oppressive when walking out; but if it had been accompanied by the sirocco it would perhaps have obliged us to return to the city. Dolomieu† observes very justly, that the nature of the wind produces a great difference in the external warmth and that which is felt at Malta. In the harbour the thermometer was, at eight o'clock in the morning, in the air 13° of Reaumur, in water from the surface of the sea 12° 5′, and from a depth of twenty-four fathoms 12°; in the evening at eight o'clock, in the air 11° 74′; at three in the morning in the air 8° 4′, and in the water 12°. The specific gravity of the sea water was rather less here than in the Adriatic sea.

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* See Note 3. page 51.

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* History of the Plague, as it lately appeared in the islands of Malta, Gozzo, Corfu, &c. by Tully. London, 1821.

† Voyage aux îles de Lipari. Paris, 1783.

The formation of the whole island, as far as we examined it, has no trace of lava, and consists of a recent marl or tufa like limestone of late origin; in some parts very soft, in others firm, and the fracture showing a fine grain, of a whitish or yellowish colour, and mixed both with numerous particles of mica, and with small, nay, microscopical shells, (now and then a few some lines in length,) or with sharks' teeth. The shells are chiefly of the species of *Mytilus* and *Cardium*, and seem, if we may be allowed to judge from the examination of a few specimens, to be of kinds that are still to be found alive. Beside these petrifications, which are very common in the grotto of St. Paul for instance, the island is said to abound in *Terebratulites*, *Belemnites*, &c. The same stone furnishes the admirable materials for building used in the island. The limestone rock is covered either with loose stones, sand, and dust, here and there converted by manure into garden ground, or by a good rich red clay, and lastly, in part by mould imported from Sicily.

The contrary wind which had hitherto detained us at Malta, changed, in the night of the 30th, to a faint S.E., and the frigate lost no time in leaving the harbour. On the 1st of May, at five in the morning, we had the Capo di S. Dimitro to the W.N.W., Lavaletta distant ten leagues; at seven o'clock the Capo was S.W. by W.; the wind continued to increase during the day, so that at half past seven in the morning we already had the middle point of Capo Maritimo, the most southerly point of Sicily, E. by S., about six leagues distant. Here the ship was again visited by many birds, sparrowhawks, swallows, turtle doves, gold thrushes and motacillæ. It seems as if these animals, impelled by instinct to emigrate, resort to points of land where two countries approach the most nearly to each other, and take advantage of ships that sail by, as resting places in their long journey. On the 3d of May we came in sight of the Toro, not far from the Sardinian coast, a bare rock rising from the sea, and soon afterwards of S. Pietro, the most westerly point of that island. Many dolphins sported round our vessel, and, according to the observations of the crew, announced that the wind would abate, as in fact it did soon afterwards.

Several phenomena indicated that we were drawing nearer to the great ocean, among which we may particularly mention the greater phosphorescence of the sea. On the voyage from Triest, we had hitherto seen only detached luminous points in the sea, but now the ship seemed in the night-time to swim in liquid fire, and as it glided along and beat against the waves, the deck was illumined by a bright light. The sight of this grand and magic nocturnal phenomenon excites the admiration of every beholder, especially if it is the first time he had the opportunity of traversing the liquid element in such splendour. The sea was covered with luminous balls, as large as a hazelnut, and with every wave that dashed against the ship in its course, it seemed to throw out sparks like hot iron, when it is hammered, or like a catherine wheel, and lighted up all the surrounding objects. Besides these innumerable balls of fire, there were other larger insulated luminous bladders, most frequently near the ship, but likewise at a distance from it, in places where the waves broke in foam. The darker the night grew, the more beautiful did the phenomenon appear; and on moonlight nights it was less visible, and only on the side where the shadow of the vessel fell. This splendid sight has been an object of investigation in the accounts of numerous voyagers. Forster explains it partly as a consequence of the electricity excited by the violent friction of the ship, and partly as phosphorescence from putrefied animal substances or luminous insects. Adanson and the later naturalists, as Von Humboldt and Peron, ascribe this phenomenon entirely to mollusca, zoophytes and other marine animals. We likewise did not neglect carefully to investigate this important subject. We had several vessels filled during the night with the luminous sea water. The hand, or whatever was wetted with this water, shone, and the vessels, when shaken, were full of luminous particles. The water, when examined the following day, by means of an admirable microscope, made by Utzschneider and Fraunhofer, showed a number of little bodies, sometimes roundish, sometimes oblong, of the size of a poppy seed. Each of them had at one end, or on the top of the head, a small navel-like opening, having from six to nine fine filaments round it, which float within the bladder, and with which the little animal seems to attach itself to other bodies, and to take its nourishment. In the inside of these bladders we sometimes saw many other small darker points crowded together on one side, or here and there some larger ones, which might be either remains of smaller animals which they had swallowed, or the spawn. These globular animalculæ, which are entirely of the nature of medusæ, and are mentioned by Peron and Lechenault, under the name of *Arethusa pelagica*, and by Savigny under that of *Noctiluca miliaris*, swim in greater or less numbers in the sea water taken up at night, and appear to the naked eye, in the sunshine, like little drops of grease. If the water is not changed, or the examination continues too long, they do not remain in the middle of the glass, but fall dead to the bottom. It is remarkable that these globular animalculæ, when they come near together, involuntarily attract each other, and form whole groups, an effect resembling the magnetic phenomena of inanimate substances. We observed a similar phenomenon on a large scale, in the daytime, here as well as on the ocean. Whole masses of these animals swam on the surface of the water in long yellowish brown stripes, and looked like a stream covered with sawdust. This, however, is never seen except when the sky is covered with thick clouds, which darken the sea. These marine infusoria appear to avoid the light of the sun, and to sink in the daytime to the bottom, to return to the surface as soon as darkness sets in; at least they were not to be found in the water which was taken up in the daytime, but only in that which we took up at night. The mode of life and the social instinct which the above-mentioned little arethusæ have in common with the other zoophytes, salpæ, &c. may perhaps be the cause that they are met with very frequently in some parts of the sea, and in others very rarely, or not at all. In the bay of Gibraltar they were so abundant, that if we only dipped a hand in the water, a furrow of light was immediately seen, and the hand when taken out shone in innumerable points. All these facts seem therefore to prove that the phosphorescence of the sea is principally to be attributed to animals. The large fiery balls, often a foot in diameter, which rise singly above the water, or swim about in it, are probably larger mollusca or medusæ, or perhaps bladders in the water, illumined by the phosphoric light of these animals. But, besides this insulated or sparkling phosphorescence, there is another, the natural characteristics of which seem not to have been yet sufficiently distinguished. At some distance from the ship, wherever two waves strike together or dash over each other, a shallow bluish streak of light, like the reflection of the lightning on the water, is seen. This light differs from that of the globular animalculæ in not consisting of single sparks or dazzling masses of light, of a bright yellow colour, but being rather equally diffused, and resembling the faint light that proceeds from burning spirits of wine. We do not pretend at present to decide on the nature of this faint light. It might be considered either as the combined reflection of the sparks of light produced by the animalculæ, or as the process of restoring the balance of electricity between the single waves, or the sea and the atmosphere, as it appears only on the surface of the clashing and breaking waves. We are almost inclined to adopt the latter opinion, especially when we consider the saltness of the sea water, which increases its electricity, and the corrupt substances in it, by which it is, as it were, rendered more organic and animalised. In all kinds of phosphorescence, oxydation and disoxydation probably act an essential part. Should we be obliged to assume a process of putrefaction in the sea, this is also an organic act, in which the putrefying substance, in the same manner as what is organic, comes into a relation with the atmosphere. But even putting all foreign substances out of the question, the sea has always a similar relation to the atmosphere, as its water, and the salt dissolved in it, become more oxydated by its motion. Whether this phenomenon therefore be explained as chemical, physical, or organical, this kind of shining appears as an effect of electricity, and of the process of oxydation in the sea, an effect which is increased and rendered visible by the peculiar beating of the waves. We leave it to other travellers more accurately to investigate and to correct the phenomena which we have stated, of the various kinds of phosphorescence and their causes.

The fresh breeze had carried our ship rapidly past the dangerous Gulf of Lyons, so that on the 4th of May we were off the island of Minorca: on the following day we passed Majorca and Ivica, and on the 6th at noon were off Cape Palos, which was eight leagues distant W. by N. The air was misty and did not permit us to have a distinct view of the land. Many large turtles swam past us, sleeping on the surface, as also several of the abovementioned large masses of zoophytes, which formed yellowish stripes on the sea. On the following day the island of Alboran appeared to the S.E. It is a sterile inhospitable limestone rock, inhabited only by sea birds, and with no other vegetation than the dyers' lichen (*Rocella tinctoria*, Ach.). It is said that the Moors sometimes land on it to dry fish, or to gather that valuable plant for dying. The mountains of Barbary were but seldom visible, but on the other hand we had almost always the picturesque chain of Granada in sight, which presented a grand spectacle when illuminated in the evening by the lightning. The wind had abated, and we could enjoy for some days the sight of the lovely green valleys, adorned with numerous villages and hamlets, extending from the sea towards the mountains. We were particularly delighted with the view of Velez Malaga, in the vicinity of which we could distinguish an aqueduct, and the road of Gibraltar winding through the mountains and pleasant gardens, in which the vine that produces the sweet and strong wine is planted near the olive. Variable faint winds brought us gradually forward, till on the 11th of May we descried the long-extended chain of Morabella, and at length were carried by a rather brisker wind, on the 12th of May at noon, into the bay of Gibraltar, where, amidst the thunder of the cannon, we happily cast anchor in safety.

NOTES TO CHAPTER II.

NOTE 1.

THE plants which we observed about Pola, besides those already specified, are — Poa annua, trivialis; Bromus tectorum, sterilis; Hordeum murinum; *Carex extensa*, capillaris; *Scirpus romanus;* Ophrys fuciflora, Arachnites; *Asparagus acutifolius; Smilax aspera; Ruscus Hypophyl-*

lum; Ornithogalum umbellatum; *Carpinus orientalis;* Orobanche major; Antirrhinum Cymbalaria; *Acanthus mollis;* Ajuga Chamæpitys, genevensis; Glechoma hederacea; Lamium purpureum; *Salvia Verbenaca;* Artemisia Absinthium; *Santolina rosmarinifolia; Leontodon taraxacoides* Hoppe, Taraxacum; Bellis perennis; Vinca major; Plantago subulata, *Coronopus;* Globularia vulgaris; Brassica Erucastrum; Crambe maritima; *Sisymbrium asperum, monense;* Thlaspi præcox; *Arabis verna; Erodium maritimum;* Geranium rotundifolium; Corydalis capnoides; *Paliurus australis;* Lathyrus sativus, *Nissolia;* Hippocrepis comosa; *Spartium junceum; Trifolium incarnatum,* scabrum, cæspitosum, *uniflorum;* Coronilla Emerus; Potentilla subacaulis, verna, opaca; Prunus Mahaleb. — The great number of species printed in *Italics,* which do not belong to the German flora, in a strict sense, but to that of the shores of the Mediterranean, may prove how much the vegetation, even of Pola, differs from ours. The species of the lowest classes are more similar to the vegetation of our German limestone tracts. Thus we observe of the fern species, — Scolopendrium officinarum, Adiantum Capillus Veneris, Asplenium viride, Pteris aquilina; of mosses and lichens, — Hypnum compressum, splendens, tamariscinum, abietinum, cupressiforme, rugulosum, Dicranum purpureum, Barbula tortuosa, Tortula apiculata, Lecidea athroocarpa, rupestris, Parmelia murorum, physodes, glauca.

NOTE 2.

Cynomorium coccineum is said to be also found in several places on the coasts of Spain and Morocco, and resembles in its form the tropical parasites — Aphyteia Hydnora, Cynomorium cayennense Balanophora, and the *Langsdorffia hypogæa,* which we discovered at Rio de Janeiro, of which we shall speak in the sequel.

NOTE 3.

We have not yet any Fauna or Flora of the island of Malta. As a contribution towards it, we will enumerate the following animals and plants, which came under our observation: — AMPHIBIA: *Testudo* Mydas; *Coluber,* indeterm. PISCES: *Raja* clavata; *Squalus* Canicula; *Uranoscopus* scaber; *Scomber* Pelamys; *Trigla* Cuculus; *Esox* Sphyræna; *Muræna* Helena. MOLLUSCA: *Sepia* Loligo, octopus; *Anomia* Cepa. INSECTA: *Ateuchus* sacer; *Pimelia* bipunctata; *Acheta* umbraculata; *Meloe* lævigata. — Forskol, in his Flora Ægyptiaco-arabica, p. xii. mentions eighty-seven Maltese plants, almost all of which we likewise found. For the convenience of the reader, the German species are printed in Roman letters, the south European in *Italic*, and the African in *ITALIC SMALL CAPITALS.* Festuca pinnata, *distachyos*, pratensis; Bromus *madritensis, rubens;* Poa annua, rigida; *Rottboellia incurvata, Lagurus ovatus;* Hordeum murinum; *Ægilops ovata;* Avena fatua; *Crypsis schœnoides; Arum italicum;* Juncus bufonius; *Ixia Bulbocodium;* Muscari comosum, *racemosum; Scilla maritima; Asphodelus ramosus; Allium ciliatum,* Cyr. — Ruppia maritima; Zannichellia palustris. — *Rumex Bucephalophorus,* acutus; *Nibo spinosa, Mönch.* — *Salsola frutescens;* Chenopodium Bonus Henricus, album; Beta vulgaris; *Salicornia fruticosa.* — *Plantago Coronopus,* subulata, lanceolata, *Psyllium.* — *Anagallis Monelli,* arvensis; *Bartschia versicolor;* Rhinanthus Crista Galli. — Euphrasia officinalis. — *Rosmarinus officinalis;* Ajuga pyramidalis; Lamium purpureum, amplexicaule; *Stachys hirta; Sideritis montana; Prasium majus;* Glechoma hederacea; Thymus Serpyllum, *Zygis;* Salvia *Verbenaca,* verticillata; *Marrubium hispanicum;* Clinopodium vulgare; Origanum vulgare. — Scrophularia nodosa; Antirrhinum Cymbalaria, *Orontium siculum, majus.* — Hyoscyamus niger, *aureus, albus; Solanum miniatum,* Bernh. nigrum, Dulcamara; Datura stramonium;

Cynoglossum pictum; Echium creticum; Anchusa italica; Lycopsis arvensis. — Hyoseris radiata; Hypochœris minima; *Seriola œthnensis; Apargia tuberosa;* SONCHUS TENERRIMUS; *Picridium vulgare; Cichorium spinosum; Anthemis maritima; Buphthalmum maritimum, spinosum.* — *Bellis annua; Chrysanthemum coronarium; Cineraria maritima;* Gnaphalium luteo-album; *Evax pygmæa;* Artemisia Absinthium; *CNICUS SYRIACUS: pycnocephalus,* lanceolatus; *Carduus marianus; Galactites tomentosa; Centaurea melitensis, Calcitrapa, solstitialis.* — *Valeriana Calcitrapa; Fedia Cornucopiæ; Scabiosa stellata.* — Sherardia arvensis; Valantia Aparine.— Hedera Helix; *TORDYLIUM HUMILE;* Daucus Carota; *Crithmum maritimum;* Cicuta virosa; *Lagœcia cuminoides.* — Adonis autumnalis; *Ranunculus muricatus.* — Papaver Rhœas; *Glancium luteum; Fumaria capreolata,* officinalis. — *Alyssum maritimum;* Raphanus Raphanistrum; Thlaspi Bursa pastoris; Brassica campestris; *Biscutella didyma.* — *Capparis spinosa; Reseda alba.* — *Malva nicæensis, Stelligera,* nov. spec. *caule prostrato stellato-piloso scabrido, foliis molliter pubescentibus suborbicularibus obsolete quinque usque septemlobis dentatis, floribus duobus vel tribus axillaribus, pedunculis quam folia brevioribus, calycibus pubescentibus, exterioris foliolis lato-ovatis;* M. sylvestris; *Alcea rosea.* — *Polycarpon tetraphyllum; Frankenia lævis; SILENE ATOCION.* — *Sedum arenarium,* Brot. *Lotus Tetragonolobus, peregrinus,* corniculatus; *Lathyrus angulatus;* Oxytropis montana; *Ononis villosa; Trifolium patens, stellatum, scabrum, tomentosum; Scorpiurus vermiculata, sulcata; Medicago mollissima, græca, tribuloides, apiculata; Melilotus cœruleus, messanensis; Hedysarum coronarium; Anthyllis Vulneraria,* with red blossom. — *Urtica pilulifera;* Euphorbia Esula, helioscopia, *nicæensis,* villosa. Of the hundred and fifty species of the Maltese flora here enumerated, fifty-six belong to Germany, ninety to the southern part of Europe, and four to the north coast of Africa.

CHAPTER III.

GIBRALTAR AND ITS ENVIRONS.

The first part of our voyage was thus concluded, and we had reached the Pillars of Hercules, which have been usually considered as the limit of the boldest enterprises of the ancients. Many of the passengers went on shore the same day, desirous of viewing a country possessing so many claims to our attention. The rock of Gibraltar, Mons Calpe, forms the nucleus of a small tongue of land, which extends into the sea from north to south, and is connected with the continent only by a low sandy slip. On the southern point, called Europa Point, and upon the west side, it rises in the form of a terrace, but towards the north and east its steep walls make it absolutely inaccessible. Its highest point, the Sugar Loaf, is 1439 English feet above the level of the sea, the Rock Battery 1350, the Signal House 1276, Windmill-hill 330, and the lowest spot, Europa Point, 105 feet. The town lies upon the western part, which is the most habitable and level. It is protected by the sea-batteries, and the formidable rows of cannon projecting from the casemates hewn in the upper part of the rock. Besides these, batteries occupy the whole circle of the rock, and are discontinued only where the sides are so steep that every attack of an enemy is impossible. The works, which are equally excellent in every point, secure to the place the reputation of being invincible, which it acquired since General Elliot's heroic defence against the combined fleets of France and Spain, in the years 1779 to 1782. The operations of centuries have given its present strength to the northern pillar of Hercules.

The town itself, the greater part of which has been rebuilt since the last three years' siege, consists of low houses, crowded together in one principal street, and several smaller ones running parallel to it, from which the old wall of the Moorish castle, built in 725, extends towards the summit of the mountain. To the south of the town in *Red Sands*, handsome gardens intended for public promenades have lately been made. Under the sultry sun of this country the children of the Flora of the Fortunate Islands, the North coast of Africa, the Cape of Good Hope, and of the East and West Indies, thrive with extraordinary luxuriance. The favourite flowers of the Spaniards from those countries, Jasmin real, Yerba doncella, Arbol del ciclo, Sauzgatillo chino, Pimienta, Arbol del coral, Don Drigo de noche *, rival the beautiful flowers of the South of Europe. Here and there large stems of the Tuna * grow against the garden-wall, as if to give a foretaste of their native western clime. The avenues along the sea-batteries enliven the scene on this side of the mountain, the upper rocky part of which is invested with a scanty verdure, by some shrubs, and the dwarf palm. † On the summit of the mountain lives an African species of ape (*Simia Inuus*, L.), which several of our party thought they had seen. It was probably brought here by the Moors. Proceeding farther up the mountain you reach a steep eminence, from which there is a surprisingly beautiful view of the sea, Mount Atlas in the S.W., and the mountains of Granada in the N.E.

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* Jasminum grandiflorum, Vinca rosea, Ailanthus glandulosa, Vitex Negundo, Capsicum fructicosum, Erythrina Corallodendron, Mirabilis Jalappa.

The sight of two quarters of the globe, and the ocean which separates them, affords to the traveller ample matter for reflection. Along the north-east side there is a narrow path by the sea-shore, by which, however, you cannot go quite round the rock, because the most frightful cliffs soon rise perpendicularly from the sea to such a dizzy height that any path is impracticable. In the most remote accessible part on this side, stands a retired and small country house of the governor's, which is peculiarly inviting by the delightful boundless prospect over the Mediterranean, and by its seclusion and silence. We were here shown, with patriotic pride, the furniture which General Elliot caused to be made out of the fragments of the floating batteries of the besiegers, which were destroyed by his red-hot balls. From this point to the northern end of the rock, towards the neutral ground, which separates Gibraltar from the Spanish line, there is no means of going round the rock but by sea. The bold gigantic form of the naked rock warms the fancy of the painter with scenery peculiar in its kind. The sea breaks with a violent surf against the steep shores, which are here and there hollowed out into deep caverns, which serve as a retreat for wild pigeons. Thousands of little sea-crabs, sea-stars, sea-hedgehogs, sea-nettles, and edible muscle, animate these barren cliffs, which afford asylum to no other living creature. The only place where a landing is practicable, and which is frequently visited by the inhabitants of Gibraltar for their recreation, is occupied by a village of fishermen, called La Galetta. A narrow path leads from thence round the other part of the rock to the northern gate of the town. The wanderer going along this path is almost terrified by the nearly perpendicular ascent of the rock just at the place where it is the highest. From this dangerous path on the precipice, you come at length, by a paved artificial causeway over an arm of the sea, to the town gate.

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* Cactus Tuna, Ficus indica, Opuntia.

† Genista linifolia, Spartium junceum, Teucrium valentinum, Phlomis fructicosa, Chamærops humilis.

General Donn, the governor, gave us leave to visit every part of the rock, even the fortifications, and endeavoured besides to procure the embassy all the amusements which the insulated sea-port could afford. At a ball we saw the light fandango and bolero of the Andalusians, alternate with the dances of the north; and in the brilliantly illuminated avenues round the palace, were heard sometimes the tender strains of Spanish madrigals, sometimes the plaintive song of a northern bard. This contrast between the south and north, here strikes the traveller at every step. In the mixture of Spanish and English inhabitants, there are many Genoese and Calabrese, who, for the most part, follow the occupation of fishermen and mariners. The number of Jews, most of whom speak Spanish, is considerable. The possession of this place by the English has not yet been able to banish the Spanish manners and language; but the abode of numerous strangers, and the great trade, give a general and comprehensive character to this staple place for the commerce of the Mediterranean. But what completes the diversified picture which the inhabitants of Gibraltar present, is the presence of Asiatics and North Africans. Of the latter, there are many Moors, particularly from Morocco, who sell fruit and fine leather manufactures in the streets. The fair North European, and the tawny native of the south, are distinguished by striking differences in the features of the face, and in their whole figure, from these strangers of oriental origin. The physiognomy of the Moors, and other Africans who are met with here, is expressive of firmness and prudence, yet without that look of cunning of which the people of the Semitic race are accused, but rather united with an agreeable frankness, content, and tranquillity of mind. A lofty forehead, oval countenance, large, expressive black eyes, shaded by arched, bushy eyebrows, a well-formed, long, but not too pointed nose, rather broad lips meeting in an acute angle, thick, smooth black hair on the head and beard, brownish yellow complexions, muscular neck, firmly knit, and robust make, with a stature above the middle size, characterise the inhabitants of North Africa as they are frequently seen in the streets of Gibraltar. Among the most dangerous diseases that occur in this bay of the Mediterranean, which, from its situation, is very hot, and especially exposed to the south wind, is the yellow fever. Only a short time previously to our arrival, many persons fell a sacrifice to this disorder. As in Cuba in the Gulf of Mexico, this destructive disease appears here also, in Cadiz, Barcelona, and other maritime towns which do not enjoy a free circulation of air, where it is still more favoured by the heat and the corrupt and enervating exhalations of the salt water.

The rock of Gibraltar consists of compact limestone, generally of a light yellow, ash grey, and smoke colour, and is often traversed with veins of calcareous spar of a greyish white or yellowish brown colour. In single drused cavities, the spar is remarkably foliated, and sometimes crystallised in pretty large tables. This limestone rock is, especially towards the N. W. side, more stratified on the surface than deeper down, and contains several smaller and larger caves, so that there can be no doubt that the prevailing formation belongs to that of the Jura, or cavern limestone. In the mass of the limestone itself we discovered no shells, except a single species of sea-snail resembling the *Buccinum undatum.* The largest of the caves, *Gruta de S. Miguel* of the Spaniards, or Saint George's cavern of the English, situated almost in the middle of the rock, and 1100 feet above the level of the sea, contains a beautiful grotto, sixty feet high, and two hundred deep, adorned with various sparry petrifications, and supported by colossal stalactical pillars. The limestone in this cavern is traversed by vast fragments of a very fine brown stalactite, of which there are large mantlepieces in the house of the governor. The Pocoroca is a similar cavern, but not so deep. The tendency to the stalactic formation appears, however, not only in the vast pillars of the caverns, but also in the outside covering of many pieces of rock exposed to the air, which have a coat of yellow striped stalactite. On the south side of the town we observed, in the red clay of a ditch, several considerable pieces of a smoky grey hornstone, such as frequently occurs also in the Jura limestone.

At Europa Point, and on the east side of the rock between the extreme fortifications of Cave Guard, and the fishing bay of La Galetta, there lies over this cavern limestone, the well known and remarkable osseous breccia (a limestone breccia), which, towards the sea, forms a mantle-shaped cavern, and seems here to dip in an angle of about 30°. In some places, it fills up the rents, clefts, and corroded hollows in the limestone rock itself. The general cement of this breccia, which is chiefly composed of fragments of the same limestone, is a stalactic mass of considerable hardness, a reddish brown colour, and full of vesicular cavities, which occur, without order, from the size of a poppy seed to an extent of several lines. Sometimes it is itself consolidated into reniform pieces of nearly concentric structure: mixed up with it are pieces, partly rounded, and partly angular, of a smoky grey, and of a light grey limestone, of which the greater part of the M. Calpe consists, and it contains kidneys or nodules of a soft very ferruginous, yellowish brown, fine-grained calcareous marl, and rounded grains of quartz of the size of a millet seed. Here and there, are wavy stripes and streaks of calcareous spar, and in the vesicular cavities, druses of a white stalactic limestone. The mixture is very hard, and the ingredients, which have often a thicker stalactic crust close to them, are thereby cemented in the strongest manner, and very difficult to break asunder. Petrified bones are very seldom found in this stony mass, but they are so much the more frequent in the more recent bed of the conglomerate, or breccia, immediately over it, which contains the same rounded little grains of quartz, and the other ingredients, though of smaller grain, that is, the rolled pieces, from the size of a hen's egg to that of a bean, as well as a considerable quantity of the light grey limestone, and shows more frequent vesicular cavities. Besides the fossil bones, we found chiefly shells of recent land-snails. They are of the size of half a line to half an inch, partly whole, partly broken. We observed most frequently and clearly the *Helix algira;* several small white fragments seem, however, to belong to other kinds, perhaps even to sea-shells. The bones and teeth of the various animals themselves, lie pretty much calcined in the breccia, mingled together, not lying in regular strata, without any trace of having been rolled in the water, very seldom entire, more often sharp-splintery, without any connection or orderly disposition of the parts, which naturally belong together. Cuvier *, to whom we are indebted for a very accurate examination of these petrifactions, has declared these bones to be those of ruminating animals and *glires,* and, as he conjectures, antelopes or stags, Siberian hares and rats. According to some imperfectly authenticated accounts *, parts of a human skeleton are said to have been found among the remains of those animals: we were not so fortunate as to see such bones anywhere in Gibraltar, or to find them in the stone itself. William and John Hunter corrected the earlier statements of others, according to specimens sent to themselves, and declared the supposed human bones to belong to ruminating animals.

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* Rapport sur les Breches Osseuses, Annales du Mus. d'Hist. Nat. tom. 13. 1809.

Over the stalactic stratum which we have described, there is a more recent limestone breccia, which lies on the surface of the ground, here and there rent into separate blocks of rock. It consists of a greyish white, or grey limestone, the *detritus* of calcined shells, very few fragments of bones, and a rather reddish, grainy, mortar-like cement; the pieces of limestone are here smaller, from half a line to six lines in diameter, and instead of the abovementioned grains of quartz, which are entirely wanting, there are whitish, pearl-like globules of stalactic limestone, resembling the Carlsbad peastones. The calcined shells are far more numerous here, and form in a manner, thin strata in the stone; no entire shells indeed are to be found among them; they seem, however, from their thickness and breadth, to belong to the common oyster; others, from their ribbed edge and convexity, perhaps, to a cockle (*Cardium*), that is to say, to marine conchylia. The water and air exercise great influence on this soft, and probably still forming mass, as deep cavities are found in it near the sea. The whole of this breccia formation may rise, perhaps, only a few hundred feet next the limestone mountain, and measure in its greatest thickness about fifty fathoms. The appearance of the petrified bones in it is very limited, as far as the country is at present known. They are found chiefly in the rock near Rosia Bay, and southward of the governor's country-house, on the sea-shore where the waves break violently against the cliffs, which in this place are from 30 to 40 feet high.

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* Drinkwater's History of the Siege of Gibraltar, London, 1786. Imrie, Transactions of the Royal Society of Edinburgh, vol. iv. 1798.

We have judged it proper to be more circumstantial in our description of the osseous breccia of Gibraltar, because the similar formation in many countries on the Adriatic and the Mediterranean, gives it very great interest in a geognostical view. For besides Gibraltar, some parts of Corsica, Cette, Antibes, Nice* in the south of France, Fustapidama in Corfu, Nona near Zara, and Ragosnitza in Dalmatia, the islands in the Golfo di Quarnero, Osero, Cherso, Sansego, &c., offer a perfectly similar breccia, which was formed from the fragments of the limestone mountains which run in a chain along the coasts of the Mediterranean. The late origin of this formation will, perhaps, be more certainly shown, if by continued accurate investigation it shall be proved to contain human bones, as many persons have supposed*, which is not impossible, since the existence of objects of art, such, for instance, as Germar mentions†, has been certified. But the larger masses of osseous breccia, which Spallanzani‡ describes as heaped up in the isle of Cerigo, so as to form a considerable mountain, and the fossils of Vicentin, Verona, and of Concud in Arragon, which are, perhaps, not dissimilar, merit, on that account, to be more accurately investigated by naturalists. It is particularly important in this extensive maritime formation that those remains of bones belong to species of animals of the herbivorous kind, which are still extant, for the most part domesticated, or at least frequently used; whereas the cavern limestone in the interior of the European continent contains only those of bears and carnivorous animals enclosed in a similar manner.

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* Faujas de St. Fond. Annal. du Mus. tom 10.

The peculiarity of the mountain of Gibraltar appears in a still more striking manner, when we consider the country immediately adjacent. About half a mile* to the north-west of it, rises another mountain called by the English, "The Queen of Spain's Chair," which extends for many leagues almost directly from north to south. On both its sides, which are very gently sloped, it has in some places verdant pastures, in others, a scanty vegetation of heaths and cistus roses, and on the ridge chiefly bare blocks of rock. This mountain consists of a coarse-grained, red, and yellowish red sandstone. In general it seems not to be regularly stratified; the rare strata run from north-east to south-west, and incline in many different angles to the south-east. Towards the sea, the mountain gradually sinks to the flat sandy tract on the sea-shore. Most of the mountains which run westward of the Queen's Chair appear to have the same direction. Behind the latter mountain, a hilly country extends, which is adorned with all the charms of luxuriant vegetation and industrious cultivation. The little town of St. Roque, stands on an eminence opposite the western foot of the mountain; avenues of noble American aloes, and flowering bushes of oleander ornament this pleasant hill, the summits of which are crowned by the fortifications of the place, which were once considerable. A low sandy beach not only occupies the neutral ground between the fortress and the Spanish lines, which are protected by the two forts of St. Barbara and St. Philip, but extends all round the bay to the Spanish town of Algesiras, situated on the west side of it. The quicksand consists of rolled pieces of quartz, flinty slate, a yellowish jasper-like stone, and limestone.*

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* James's History of the Herculean Strait. London. 1773. Donati, Storia del Mar Adriatico. Forlis, Saggio d'osservazioni sopra le Isole di Cherso ed Osero. Venez. 1771. iv. p. 99.

† Journey to Dalmatia and Ragusa. Lips. 1817. Where he represents the whole formation of this osseous breccia under the name of an alluvial mountain. Among the substances found in the mass he mentions a piece of glass; iron nails have also been found in it.

‡ Observations on the isle of Cerigo.

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* It is not stated whether we are to understand a German mile, which is about four and half English miles. *Trans.*

We crossed this little sandy desert in going from Gibraltar to visit the Spanish lines and Algesiras. At the frontier posts were a few Spanish troops of the line garrisoned in small houses; and, being unprotected from the beams of the sun, have a very disagreeable abode during the summer months: we obtained permission to visit the Spanish territory in our scientific excursion. Besides a few small gardens round the dwellings, we saw nothing on this strand except some single strand plants, which but sparingly cover the poverty of this tract, which the wind has raised into sandhills. Lizards, several species of *Pimelia*, *Copris*, and *Scarites*, are the chief inhabitants (of the animal kingdom) of this sandy soil. Proceeding this way along the coast we passed two inconsiderable streams. Nearer to Algesiras we entered a little grove of pines. The town itself, a well-built pleasant place, enjoys a delightful situation. To the west of it, are gently rising hills, adorned with lovely verdure, scattered pines and cork trees; and from their summits a charming prospect opens into the valley. A lofty aqueduct brings water from the mountains, across the plains, to the town. The bay of Gibraltar, covered with innumerable vessels, extends here before the eye of the traveller, and the lofty Calpe, with its steep cliffs, bounds the prospect in the horizon. The hills round Algesiras are composed of the same red sandstone as that of which the Queen's Chair consists. They are sparingly shaded by the Spanish oak and the cork tree (*Quercus esculus* and *suber*), and diversified by the finest flowering shrubs, among which is the *Rhododendron ponticum*, probably a remnant of Moorish horticulture; but they are inhabited by the European scorpion and the American scolopendra.*

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* Germar mentions, after Chrysogono, in particular, the existence of horns.

Near Algesiras, between the town and the Cabrita to the south of it, some antiquarians fix the place where Karteia, afterwards called Heraclea by the Romans, stood, a flourishing trading colony of the Phœnicians. Carter † says that he saw the ruins of this city on the banks of the little river Guadaranque.

Southwest of Algesiras lies Tarifa, the most southerly point of Andalusia, and of the whole European continent. The way to it, through meadows and over scantily wooded sandstone hills, is very diversified. This little town is, for the most part, of ancient construction, and still possesses fortifications erected in the times of the Moors, which, however, are of far less importance at present than when the Saracens made this place the chief medium of their intercourse with Africa. This connection of Tarifa with the Moors, seems to have left some traces even in the physiognomy of the inhabitants. Their complexion and features are said to resemble the Arabian more than those of the other inhabitants of Andalusia. The beauty of the women of Tarifa is particularly celebrated, the charms of which they contrive to heighten, by improving their form with the black silk garment, and increasing the lustre of their ardent eyes by letting one of them peep through the veil which envelops their face. The Romans were already acquainted with the importance of this place, and peopled the town, which they called Julia Joza or Traducta, with colonists of Punic origin from Tingis (Tangier). At present the place being thinly peopled and without trade, has no general interest, except from its situation on the strait, from which it lies about a quarter of a league distant, with sandhills and sandbanks intervening.

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* See Note, page 77.

† Journey from Gibraltar to Malaga.

From the towers of the town may be seen the opposite coast of Africa. Alcazar el Ceguer, a seaport of some importance under the Moors, but now deserted, is only three miles distant from Tarifa; to the east and west the strait becomes broader. The southern pillar of Hercules, Mons Abyla (Kynegetica, in some passages of the ancients), or the Mountain of Monkeys, at the foot of which Ceuta is situated, rises nearly opposite to Gibraltar; towards the west appears the chain of mountains which extends behind Tangier, and terminates in Cape Espartel. The current may be easily perceived in the strait, which constantly brings water from the ocean into the Mediterranean, and gave rise to Halley's well-known theory, of the more rapid evaporation of the water in that sea. This current runs about four or five leagues in the hour, and is so strong, that even large ships cannot sail from the strait to the west without a good east wind, for which reason they are frequently obliged to remain a long time in the harbour of Gibraltar, whereas vessels from the Atlantic can enter, even with a contrary wind. In the Mediterranean, the current is perceptible as far as the coast of Malaga, twenty leagues, or according to others, Cabo de Gata, seventy leagues from Gibraltar. Rennel's observation * is, that the whole surface of the ocean, from the 45th to the 30th degree of latitude, to the distance of a hundred and thirty miles westward of the shores of Europe and Africa, is in motion towards the Pillars of Hercules, and runs between Cape St. Vincent and Cape Cantin, as it were into a funnel, of which the strait of Gibraltar is the mouth. This current is connected with that which goes southward along the western coast of Spain and Portugal, is felt beyond Madeira, and causes vessels, bound to Madeira or

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* Edinburgh Philosophical Journal, 1821, vol. iv. p. 241.

the Canary Islands, to deviate from their course, to the south-east. Besides the current in the strait, from the ocean towards the east, a contrary motion of the Mediterranean from east to west, is observable below the surface. The existence of this lower current is further strengthened by the well known reappearance of a ship, sunk in the strait, to the west of it.* The greater specific gravity of the sea water in the Mediterranean, may be perhaps looked upon as the chief cause of this countercurrent. The accounts of travellers agree in this difference in the specific gravity, and our own observations confirm it, as we found that of the Mediterranean to be 1.03384, and that of the Atlantic ocean, near the strait, 1.02944.† The experiments of Marcet*, it is true, do not show the specific gravity of the sea water, in the strait, taken from a considerable depth, to be greater than that of the surface. With respect to this difference, we too are unable to state anything positive, on account of the quickness of our passage, and for want of a convenient opportunity of procuring water from a sufficient depth; the certainty, however, of the greater specific gravity in the Mediterranean, may serve as an explanation, whereas, the accuracy of the result of Marcet's experiments may be doubted, on account of the difficulty of obtaining sea water, from a requisite depth. But if there is a difference in the specific gravity of the water of both seas, the countercurrent must really take place as supposed, because in the collision of two fluids of different gravity, the heavier naturally flows under the lighter. Besides the most important cause of the current in the strait, which we have stated, others may contribute. Thus the revolution of our planet round its axis, which communicates to the sea that general motion from east to west, probably exercises its influence below the surface of the sea. Another cause of the lower current towards the west, may be looked for in the pressure of the many streams, some of them very

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* Drinkwater's History of the late Siege of Gibraltar; Waiz, in Schwed. Abhandl. 1757; Marcet, in Phil. Trans. 1819; Patton, in Edinb. Phil. Journ. 1821, vol. iv. p. 243. It is also confirmed by two opposite currents in other straits, as in the Dardanelles, in the Sound, &c. Mr. Von Hoff (History of the natural Changes of the Surface of the Earth, Gotha, 1822. 8.) has very lately suggested doubts, not indeed of the existence of a sub-marine countercurrent, but of water being conveyed by it from the Mediterranean to the ocean, for he supposes that the motion towards the west, begins in the middle of the strait itself, and therefore proceeds only from the lower parts of the water of the ocean, which are hindered, by a supposed dam at the bottom of the strait, from entering the more shallow Mediterranean, so that they strike against it, and must return to the west.

† The observation made by Lalande (Voyage en Italie) that the water on the coast of France is lighter than that in the middle of the sea, as it contains only $\frac{1}{34}$ to $\frac{1}{30}$, and not $\frac{1}{27}$ to $\frac{1}{22}$, of its weight of salt, does not contradict our supposition,

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because the water, which flows out at Gibraltar, can only come from a considerable depth, and consequently from the middle of the sea.

* Phil. Trans. in the place above quoted.

considerable, falling into the Mediterranean, and that of the Black Sea, entering it from the east; this pressure can become sensible only at the single, proportionably narrow, issue of the Mediterranean, where it easily overcomes the counterpressure of the ocean, the force of which is broken by the coast of the two continents, by which it is bounded. Lastly, in considering the causes of this motion of the waters, we must bear in mind the possibility of a dam, which when the two seas formerly broke through the isthmus which separated them, still remained, and even now causes certain directions in the course of the water. The inconsiderable lateral currents, on the surface of the strait, towards the west, which Tofino, and others before him, have remarked, are perhaps to be considered as secondary effects of the main current, such as are observed on the banks of large rivers, and as they are chiefly observed at new and full moon, partly as caused by that planet.

It is a general opinion of the Spanish fishermen, that the strait grows gradually wider, and this perfectly coincides with the historical accounts of the breadth of the strait.* This enlargement of the channel, may, perhaps, be connected with the subsiding of the surface of the Mediterranean in general, a phenomenon, for which more historical and physical testimony may be found, than for the contrary one, of its increase, by encroaching on the land in some places, which probably may depend upon local circumstances. The filling up several harbours with sand, the alluvion of considerable tracts upon the coasts, and the union of islands and rocks, with the continent, which were formerly surrounded by the sea, even where there are no rivers like the Nile to produce this effect, occur on many parts of the coast.* The Black Sea and the Caspian offer a phenomenon perfectly similar, very large tracts having gradually become uncovered on their coasts; it is therefore probable that these formerly great inland seas, began to decrease in depth when they became connected with the ocean. But the hypothesis, that the great basin which was once formed by the Euxine and the Sea of Asoph, and perhaps also by the Caspian, after bursting its dam in the Bosphorus, flowed westwards into the Mediterranean, but receded on the east, from the declivities of the Steppe of Caucasus into the pre-

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* The earliest statement of Skylax of Caryanda makes the breadth of the strait equal to that of the Thracian Bosphorus, that is only a quarter of a geographical mile. The accounts of the breadth make it greater as they approach nearer to our times. Thus, later than the time of Skylax, it is stated at three-fifths of a geographical mile; still later, at one geographical

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mile; by Strabo, one geographical mile and a half; by Pliny, almost one geographical mile and two-fifths. At present the narrowest part is almost two geographical miles. (See Von Hoff's abovementioned work, p. 150.)

[*] The facts are collected with great diligence in Mr. Von Hoff's abovementioned work.

sent level of the Caspian sea, should be combined, we think, with the opening of the strait of Gibraltar; at least, there are not so many physical reasons for believing that the strait was formed by the ocean breaking through. It must be left to future investigation, to determine whether a conformation like that in the Mediterranean is found in other great gulfs, for instance, that of Mexico, which it in so many respects resembles.

The formation of the mountains in the vicinity of the town of Tarifa, agrees with that about Gibraltar; the limestone, however, is in thin strata, and the slabs are therefore used for domestic purposes. On the limestone lies a slaty bluish sandstone, of a finer grain than that of St. Roque. On the most southern point of the continent, which runs out from the harbour, towards a small rocky island, on which a tower is built, we observe a massy conglomerate of rolled fragments of limestone, and remains of still existing sea animals, such as cardium, mytilus, and the large flat edible *Ostrea jacobæa* (the Mediterranean scallop), which are sometimes heaped together in thick layers, united only by a little stalactic limestone. There are also petrified alcyonia, corallines, sponges, madrepores, &c. in this alluvial land, which has evident traces of a very recent origin; it appears to be constantly on the increase, as the sea daily brings a sufficient quantity of marine animals, and calcareous cement.

After we had viewed the environs of Tarifa, the company, including Baron Von Neveu, resolved to return, in a small fishing boat, to Algesiras. We all felt ourselves in an agreeable frame of mind, at the view of this southern country, and delighted with the peculiar romantic spirit of the Spanish people, which is more freely manifested here, as it generally is in the warmer countries, and our longing after the tropical regions was increased. The evening was delightful, the night clear and serene, and the constellations of the northern hemisphere, reflected in the gently agitated waves of the strait, appeared to us here at the mouth of the ocean, to beam upon us with their friendly rays, as if to bid us a last farewell. We had scarcely arrived at Algesiras, when the ambassador received orders from the Court of Vienna, for the Austria to proceed alone to Rio de Janeiro, without waiting for the rest of the convoy. As the news of the troubles of Pernambuco had just then been received at Gibraltar, we congratulated ourselves on thus escaping a further loss of time, which might be caused by the continued delay of the Portuguese squadron. We had been only one day in Algesiras, when the east wind suddenly set in, and we were summoned on board by a gun fired from the Austria, and the hoisting of the signal flag. Towards noon a boat appeared, with the news that the frigate would sail in an hour, and immediately conveyed us on board.

All was ready for sailing; only our colleague, Professor Mikan, who had gone too far from Algesiras, on a botanical excursion, had not yet returned; we therefore began to be uneasy on his account, when just as the anchor was weighed, and the sails spread, he fortunately came on board.

NOTE TO CHAPTER III.

The animals collected at Gibraltar and Algesiras are —Amphibia: *Testudo* Mydas; *Lacerta* lepida, viridis, ocellata, bosciana, maculata; *Scineus* algira; *Gecko* fascicularis; *Seps* tridactylus. Pisces: *Muræna* Anguilla, Helena; *Esox* Sphyraena, Belone; *Pleuronectes* Solea; *Labrus* microlepidotus, maculatus, carneus; *Epinephelus* ruber; *Trigla* pini; *Raja* Torpedo; *Syngnathus* Typhle; *Blennius* viviparus, Pholis; *Trichiurus* ensiformis. Insecta: *Scarabæus* stercorarius, vernalis; *Geotrupes* punctatus; *Copris* hispana, Paniscus; *Onites* Bison, Sphinx; *Oniticellus* flavipes; *Onthophagus* Taurus, medius, Schreberi; *Hister* æqualis, bipustulatus, unicolor; *Ateuchus* sacer, semipunctatus, variolosus, flagellatus; *Trox* granulatus; *Cetonia* Morio, stictica, hirta; *Omaloplia* terricola, ruricola, brunnea; *Anisoplia* fruticola, horticola; *Hoplia* argentea; *Silpha* rugosa, lunata; *Scarites* Gigas, subterraneus, levigatus; *Proscus* cephalotes; *Staphylinus* olens; *Zuphium* olens; *Aptinus* Ballista? *Buprestris* villosa; *Akis* acuminata; *Tentyria* orbiculata; *Erodius* gibbus; *Scaurus* striatus, punctatus; *Pimelia* muricata, bipunctata; *Helops* caraboides; *Ditomus* sphærocephalus; *Cistela* ruficollis; *Lagria* hirta, læta; *Lixus* ferrugatus, angustatus; *Pachygaster* goerzensis; *Chrysomela* eumolpa; *Colaspis* areata; *Clythra* longimana, humeralis; *Cossyphus* Hoffmanseggii; *Coccinella* mutabilis; *Forficula* auricularia, Panorpa halterata; *Xylocopa* violacea; *Andrena* plumipes; *Scolia* flavifrons; *Bombus* terrestris; *Sphex* spirifex; *Scorpio* australis, europæus; *Scolopendra* morsitans; *Julus* Indus, terrestris;

Cymothon physodes, linearis; *Oniscus* pustulatus, Asellus, Armadillo, sylvestris; Aranea picea; *Ligæus* equestris, Tabanus bovinus; *Bombylius* melanocephalus, fuscus; *Truxalis* hungaricus; *Papilio* D. Hyali; N. Megæra; Sat. Pasiphæ, Janira, Rumina; Pleb. R. Phlaius. VERMES: *Sipunculus* nudus; *Noctiluca* miliaris; *Veretillum* cynomorium; *Actinia*, div. sp.

The plants belonging to the Downs of Gibraltar are—*Scirpus Holoschœnus; CYPERUS FASCICULARIS; Bromus rubens; FESTUCA ALOPECUROS, Calycina,* Digitaria, Dactylon; Juncus maritimus; Polygonum maritimum; *RUMEX THYRSOIDEUS; Plantago Lofflingii, Lagopus*; Salicornia fructicosa; *Convolvulus Soldanella; Scrophularia frutescens, Crucianella maritima;* Cakile maritima; *Cheiranthus trilobus; Cachrys Libanotis; Caucalis maritima; DAUCUS MURICATUS;* Oenanthe pimpinelloides; *ERYNGIUM ILICIFOLIUM; Frankenia lævis;* Anagallis cœrulea, *Monelli; Linum maritimum; Drosophyllum Lusitanicum, Lk.*; *Corrigiola littoralis; Medicago marina; ONONIS RAMOSISSIMA, viscosa, VARIEGATA, PICTA, HISPIDA;* Euphorbia Paralius.—The vegetation of the mostly dry hills about Algesiras agrees with that of the Queen's Chair; we found on both—*Daphne Gnidium, villosa; PASSERINA CANESCENS; Olea europæa;* Ligustrum officinale; *Thymus vulgaris, Zygis, patavinus; Eriostemum Lusitanicum, Lk.*; *Sideritis romana, subspinosa; Prasium majus; LAVANDULA MULTIFIDA; Phlomis purpurea; Teucrium valentinum; Rosmarinus officinalis;* Hedera Helix; *Erica umbellata, scoparia, australis; Cistus populifolius, formosus; Helianthemum halimifolium, glutinosum, serratum, guttatum; Tuberaria; Delphinium peregrinum, PENTAGYNUM;* Rubus fruticosus; *Polygala monspeliensis; Sedum arenarium,* Brot.; Ulex europæus; *Genista candicans, tridentata; Trifolium angustifolium; Spartium spinosum; Pistacia Lentiscus.*—In the meadows and pastures there were—*Cyperus longus*; Scirpus acicularis; *Schœnus*

mucronatus, nigricans; Panicum verticillatum; Cynodon Dactylon; *Agrostis miliacea;* Phalaris arundinacea; *Festuca uniglumis, ciliata, divaricata; Brachypodium distachyum;* Poa annua, trivialis; *Briza maxima, minima;* Phleum pratense; *Alopecurus pratensis; Ægilops ovata; Chrysurus cynosuroides; Cenchrus echinatus;* Lolium arvense; Elymus europæus; *Andropogon Gryllus; Arundo Donax; Dactylis hispanica*, glomerata; *Trisetum paniceum;* Danthonia decumbens; *Piptatherum* (*Milium*) *comosum;* Anthoxanthum odoratum, β. minus; *Stipa tortilis;* Gladiolus communis; Alisma ranunculoides; *Valeriana Calcitrapa, Fedia, Cornucopiæ, Plantago, Psyllium, Bellardi*, lanceolata; Chenopodium album; *Illecebrum Paronychia, echinatum; Prunella intermedia;* Betonica stricta; *SALVIA BICOLOR; Orontium siculum, calycinum, Asarina, Orobanche minor; Batschia viscosa, versicolor; Pinguicula lusitanica;* Veronica arvensis, hederæfolia; *Echium violaceum, creticum; Cerinthe aspera; Lithospermum fruticosum;* Symphytum tuberosum; Myosotis scorpioides, arvensis; *Anchusa italica; Cynoglossum pictum; Hyoscyamus albus;* Solanum nigrum, *miniatum;* Convolvulus *althæoides*, sepium arvensis, *tricolor; Anagallis Monelli, COLLINA, latifolia;* Samolus Valerandi; Hottonia palustris; *Campanula Erinus; Lobelia urens; Galium hirsutum* Nees (*ovalifolium*, Schott.); *Rubia lucida*, tinctorum; Valantia cruciata; Sherardia arvensis; Dipsacus sylvestris; *Scabiosa Grammuntia, grandiflora*, Columbaria; Anthemis arvensis; *Scolymus hispanicus; Centrospermum chrysanthemum* Spreng.; *Cynara pygmæa; CHICHORIUM DIVARICATUM; Sison Anisum;* Oenanthe pimpinelloides, *prolifera, apiifolia;* Viola canina; Lythrum Hyssopifolia; *Lychnis læta;* Linum usitatissimum, *Strictum;* Silene gallica, *bellidifolia, Cerastium dioicum;* Erythræa *conferta*, grandiflora, *maritima; STATICE ALLIACEA;* Chlora perfoliata; Hypericum perforatum, *ciliatum;* Papaver Rhœas; Euphorbia segetalis, *retusa*, Esula; *Lotus edulis, intermedius, Lois; Medicago*

Terebellum uncinata, *orbiculata*; *Scorpiurus vermiculata*; *Vicia hirta*, *sulcata*, *atropurpurea*.—Lastly, the plants which we have noticed as most characteristic on the rock of Gibraltar are—*Daphne Gnidium*; *Anarrhinum tenellum*; *Prasium majus*; *NEPETA RETICULATA*; *Phlomis purpurea*, *Teucrium valentinum*; *Lavandula multifida*; *Thymus patavinus*; *Sideritis subspinosa*; *Statice cordata*, *sinuata*; *Verbascum sinuatum*; *Vinca major*; *Cotyledon Umbilicus*; *Fumaria capriolata*; *Genista candicans*; and lastly, *Chamærops humilis*, the European Dwarf Palm, the fruit of which is a favourite food of the monkeys.—The species whose names are printed in Roman characters belong to the temperate part of Europe, those in *Italics* to the south of Europe, and those in *ITALIC SMALL CAPITALS* to the latter, and particularly to the north of Africa.

CHAPTER IV.

VOYAGE FROM GIBRALTAR TO MADEIRA, AND ACROSS THE ATLANTIC OCEAN TO RIO DE JANEIRO.

On the 3d of June, at noon, we left the bay of Gibraltar, accompanied by above fifty vessels of various sizes, which, like ourselves, had waited for a favourable wind to proceed from the strait into the ocean. There was a fresh east wind, and our vessel, which was a remarkably quick sailer, soon got the start of all the other ships. In an hour we had already doubled the most easterly point of Cabo Carnero, and were in the middle of the strait where the two continents are only a few miles from each other. The current from the west is here very remarkable, and every experienced eye readily perceives its effects on ships coming from the ocean. According to the general opinion, it runs from four to five leagues in an hour, which are therefore deducted from the ship's reckoning in sailing out. While we proceeded over the dark green waters of the strait, the Spanish coast appeared in a blue mist; we could clearly distinguish two chains of mountains running from the E.N.E. to W.S.W. The most distant rises considerably above the nearer verdant hills, which gently ascending, rest on the steeper and more naked ridges of the others, and intersected by many little valleys, extend without any abrupt declivities towards the sea. On two of the extreme points of this cape there are still standing some Moorish watch-towers, and further to the west, we saw the sandy cape of Trafalgar, celebrated for the victory of Nelson. A blue streak higher towards the N. W. which terminates in the narrow Cabo de S. Sebastian, was the last point of the European continent which we were able to see. The mountains on the African side of the strait were, for the most part, enveloped in mist; they, however, appeared to us in their general outline to resemble those of the Spanish coast. At four o'clock we passed Tangiers at a distance of three or four leagues; we could clearly distinguish the town with its small, flat-roofed houses, surrounded with walls, and low square towers, behind which are steep limestone hills, and here and there detached masses of rock. At five o'clock, Cabo Spartel lay about six leagues distant in E.S.E.; the thought of leaving two quarters of the world to proceed to a third, affected us all. The vicinity of ancient Africa, which has remained the same for centuries, without improvement, the recollections of the boundaries which antiquity believed were set by these straits to its enterprises; the tradition of the happy Atlantis, which we hoped to find again in the luxuriant America, so rich in the wonders of nature; the idea of bidding farewell to Europe, the seat of civilisation and intellectual superiority; every thing combined to make the passage between the Pillars of Hercules into the ocean, a moment in our lives never to be forgotten.

At six o'clock in the evening the last points of the European and African coasts vanished from our eyes, and we were in the midst of the ocean; the waves rose majestically over each other, and seemed to swallow up the vessels as they glided down into their deep hollows; the ocean itself, like the serene firmament above it, showed as it were, in its deep blue, an image of its unfathomable depth. Each of the ships that had sailed with us, henceforth guided by the compass, pursued upon the ocean which divides and unites all the continents, the way to its own destination; our frigate, which was a-head of all the rest, advanced with incredible rapidity towards the west. The wind still continued to blow briskly from the east, and the sails and deck were covered with dew; we sailed upon an average nine miles an hour. Though the first sight of the boundless element, of the rising and setting sun, of the moon and the starry heavens, transported the imagination of the beholder, the mode of life on board offered but little variety and amusement. The phosphorescence was very inconsiderable in this latitude, and, proceeding from only a few single animals, did not present the splendid sight which had gratified us in the Mediterranean. The greater was our pleasure that the stronger and more favourable the wind became, and the more rapidly the ship sailed, the sea-sickness, from which so many of us had suffered during our passage through the Mediterranean, gradually disappeared, and we were all able to remain upon deck without any inconvenience.

The sea-sickness is extremely troublesome to people at sea. All are not attacked in the same degree; in general, persons of strong constitution, and dwelling on the sea-coast, appear to suffer less from it than such as are weakly, and inhabitants of inland or mountainous countries. Instances of the contrary are, however, to be met with; nay, even sailors inured by many voyages, are attacked by it during violent storms. It is certain that the cause of this disorder is not so much the sight of the boundless ocean, the fear of danger excited by it, and the disagreeable smell proceeding from the water in the hold, which immediately corrupts, longing for home, &c. but principally, if not entirely, the unsteady motion of the ship. The sensation which the voyager experiences from the heaving of the immense fluid element, is exactly similar to that which many persons feel from the motion of a carriage by land, and many continue to feel it even after they have been several hours on shore. This sickness generally commences with an oppression and pain in the head, and proceeds through a series of the most disagreeable sensations to more or less painful contractions in the stomach, which terminate in continued and violent vomitings, which sometimes even cause the bursting of a blood-vessel; or it happens that the patients, from the disgust excited by the smell or sight of food, fall into consumption for want of proper nourishment, and in long voyages are often in danger of their lives. He who has experienced the torments of this disorder, knows that a person attacked by it would willingly exchange all earthly happiness, for a single hour on shore, and will therefore consider it as no unimportant object in in the journal of a voyage. Several remedies have been proposed to remove or to alleviate this disagreeable sickness. Seafaring people especially recommend oranges, and the rust of the anchor. The most approved means against this evil are dietetical, and require above all things to remain as much as possible upon deck in the open air, and near the main mast, where the rocking of the vessel is least felt; not to look at the surface of the sea at all, or not steadfastly; to accustom yourself, instead of fluid, and especially warm nutriment, to solid, cold, particularly acid food, and such as requires good digestion; for instance, salt fish, ham, &c., but principally to overcome the first attacks of the sickness, and even the disposition to vomit, by immediately taking heavy food, however reluctantly, and by pleasing amusement. Above all things, you must be careful not to leave the deck, or at the first attack of head-ach, to go down into the confined air of the cabin. But if, notwithstanding, the disease becomes so severe that you become quite despondent, and hardly able to move, no relief is to be expected but from an entirely horizontal position, and from the sleep which then ensues. In this position it is advisable, after some repose, to take some porter, solid cold food, such as ham, and then return into the air. Resolution and amusement can do much, whereas meditation and mental exertion, particularly in weak persons, may excite or prolong the disease. The less people reflect, and the more they divert themselves by various employments, by walking about on deck, nay, even by fencing, and sailors' work, the more easily do they become accustomed to the motion, particularly on a long voyage. In this manner we too were gradually more rarely visited by this disagreeable disorder, and favoured by fine weather, were able to spend the whole day upon deck. Only when the sea is very high, and the motion of the ship very violent, the first sensations return, though only for a time; but the more uniform the wind and the movement of the ship were, the more easily did we accustom ourselves to it, and the more agreeable did a seafaring life appear to us.

The wind continuing to be favourable, we soon reached Madeira. On the 5th of June, in the evening, when thin clouds began to overspread the horizon, we saw several birds, among others the *Procellaria pelagica*, swimming on the surface, which were all indications of the vicinity of land. We therefore shortened sail during the night. At six o'clock the following morning we descried, about six miles south of us, the three desert islands, Ilhas Desertas, belonging to the group of Madeira, rising like ruined portals or immense arches, out of the boundless ocean. The most northern of these three bare rocks, which has scarcely any inhabitants but a few sea-gulls, nor any other vegetation than the dyers' lichen *, is the lowest; the middle one, the largest in circumference, and the most southerly one (Bogia), on the other hand, are steeper, and may both be seen at a distance of eight or nine miles. The channels between these rocks, and between them and Madeira, are safe, in very few places less than sixty fathoms deep, and here and there from two to five hundred. In the summer months, during which the N.E. wind regularly prevails, a south-western current of the waters is perceived in them. The fog, which had hitherto concealed Madeira, which bore S.W., dispersed as the sun rose higher, and about nine o'clock we clearly distinguished the eastern promontory, Cabo de S. Lourenço; the multiform reddish cliffs rising steeply above each other, extend far into the sea. Leaving it to the north of us, we were delighted with the prospect of the luxuriant valley of Porto Novo; its verdant slopes rising out of the sea, are adorned with scattered habitations of a dazzling white. The brown or red walls, and steep sides of the rugged mountain that traverses the island, form a pleasing contrast with the rich green of the flowery valleys. Nothing can be more enchanting than the prospect of this island, which seems to float like a pleasant garden on the bosom of the ocean. We soon descried the town of Funchal to the N.W. and the steep Pico da Cruz rising behind it. In the evening, when the frigate was not far from the shore, the colours were hoisted, and a Portuguese boat immediately came from the town to make the usual enquiries. A stronger wind arising, which made the anchorage on the very steep rocky bottom still more unsafe and dangerous, the captain thought proper to continue under sail; a boat was therefore put out to land the embassy, and the naturalists, while the frigate remained in the roads during the night. The exposed situation of this harbour, where the ships, during high winds, particularly from the S.E. and S.W., may easily run against the cliffs of the coast, made this precaution necessary. It was not till the following day at noon, when we had already ascended the mountainous part of the island, and were enjoying the fine prospect of the ocean, that the salute of the frigate announced that she had come to an anchor.

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* See Note 1. page 125.

Great preparations had been made for the reception of the arch-duchess in this beautiful island, which was the first of the Portuguese possessions which Her Imperial Highness was to visit, and the embassy received repeated invitations to spend a few days here. It had, however, been determined to remain here no longer than was necessary to take in a stock of the excellent wine of the island, and as this was done on the day of our arrival, the naturalists had only one day to visit the immediate vicinity of Funchal. We visited the town the same evening. The principal street runs near the sea coast, the smaller side streets, consisting for the most part of old ruinous houses, extend up the sides of the mountain. An open square, in the middle of the town, opposite the church, is planted with rows of exotic trees, with *Dracæna draco, Jasminum azoricum,* and *Datura arborea*, the last of which was just then covered with its beautiful large blossoms. The governor of the island, who has also under him the neighbouring Porto Santo, resides in a very spacious and handsome fort, close to the harbour. This fort, as well as the immediate vicinity of the principal church, was splendidly illuminated during the night, when the governor gave a magnificent ball and entertainment in honour of the embassy. The ladies were carried to the palace in palanquins, richly gilded, and in fine veiled nets, fastened to poles; the bearers were negroes, the great number of whom surprised us the more, as we even saw some ecclesiastics of this colour. With respect to the general physiognomical character of the common people of Madeira, they are lean, muscular, of brown complexion, black disordered hair, bushy eyebrows, and dark eyes. In their coarse sailor's dress, with a pointed red cap, they excite more fear than confidence. The complexion, which very frequently has a tinge of dark brown, calls to mind the formerly more frequent mixture of whites and negroes, who were imported here in great numbers from Guinea. As in the countries of southern Europe, the ass is the principal domestic animal on which burdens are transported from one place to another; waggons, made in the shape of sledges, and drawn by many oxen, are very rarely seen in this mountainous country, and a chaise still more so.

The naturalists preferred an acquaintance with the interior of the island to the pleasures of the entainment. By daybreak we were already on our way to the eminence which rises amphitheatrically from the harbour, and is intersected by several valleys, into which streams of the purest water descend. Numerous small country houses lie scattered between gardens and vineyards, and the wanderer meets a pleasing picture of the persevering industry of the inhabitants, who have cultivated even steep hills, planted them with vines, and watered them by extensive canals. Walking by the side of such an aqueduct, which was built with bricks, and divided into many branches, which conveys several springs from the upper part of the island, we arrived at a hill in the shape of a dome, opposite the north-eastern part of the town, from which there is a delightful prospect over the deep valleys, the town with its verdant environs, the harbour, and the ocean. At the foot of the mountain, planted singly about the country houses, are the waving date palm, the broad-leafed pisang, the juicy sugar-cane, the edible yams *, maize, and melons; higher up the mountain are vines trained upon lattices, and fenced with aloes and cactus, which spread as it were a green carpet over this beautiful island; still farther up the mountain is a shady wood of sweet chesnuts and laurel trees; lastly, the highest points are covered with heath, broom, ferns, and grasses. If we take a comprehensive view of the whole, we fancy that we have, in these deep mountainous defiles, adorned with the juicy verdure of the vine, these steep ascending pastures, which lean on lofty basalt walls, these beautiful shady woods, diversified by limpid streams rushing over the rocks, the picture of an European alpine country, which has been enriched with all the additional charms of a southern clime. The black basalt walls, however, impart an air of melancholy to the landscape which, at least during the time of our visit, was rendered more striking by the remarkably small number of

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* Phœnix dactylifera, Musa sapientum and paradisiaca, Saccharum officinarum, Caladium esculentum.

animals, for we scarcely saw any except a few European singing birds, waterwagtails, some butterflies, and a few other insects (*Brachycerus barbarus, Asida coriacea nobis*) which inhabit the barren rock. The birds, probably, fly backwards and forwards between the islands and the European and African continents. On the naked shores of the island, which are even without sand, there are no muscles or sea-stars, and in the adjacent seas but few fish, for which reason the dried fish of North America meet with a ready sale. This scarcity of animals in the island is common to many volcanic countries.

The principal chain of this island extends in the direction of W. by N. to E. by S. Its extreme points are Cabo de Pargo, and Cabo de S. Lourenço. The highest ridge, which rises in the Pico Ruivo to the height of 5250 feet, runs nearly through the centre of the island, many branches diverging from it in several directions towards the sea, forming valleys of different depths. The mountains are every where found to consist of a greyish black basalt, either compact or with vesicular cavities, the external characters of which entirely correspond with the appearance of other basalt mountains, but it does not show those columnal forms which are so often seen in basalt. Towards the summit we thought we distinguished a kind of steps, in more or less massy divisions, and also more frequent vesicular cavities in it.

The latter are irregularly scattered, some of them very small, others several lines long and broad, or sometimes run together into irregular hollows. Near them the colour of the basalt is either quite the same, or declines into a yellowish brown, which is probably caused by a decomposition, partly of the iron, and partly of the olivin; the latter is in great quantities, and of different dimensions, imbedded in the mass of the basalt; when fresh broken it is shining, and of a light olive green. In a weak state of oxydation its imperfectly foliated fracture separates, and such pieces are iridescent; it shows then principally a dark yellow or brown colour, in which the lustre and transparency are lost. The phenomenon of the attraction and repulsion of the magnetic needle is very evident in the basalt of Madeira; it often approaches the wacke; its vesicular cavities are then larger, often above an inch in length, and sometimes filled with a bluish earth, but generally lined with a pulverulent coating. In this softer stone are imbedded grains of olivin, often of a yellowish brown colour. At a considerable elevation, particularly on the surface of the ground, the rock consists entirely of wacke. It is of an ash and bluish grey colour, mingled with small, scaly, black points. The stratification is very apparent in it; the layers are generally horizontal, and their hardness and weight is less. The phenomenon of polarity was more obvious in this wacke than in the basalt which lay lower, which coincides with the observation made by Giesecke, according to which the basalt at elevated points is more magnetic than that in lower situations.* That the basalt sooner acquires polarity in elevated places, that is, where it is more insulated from the soil, is to be ascribed to the same cause; in consequence of which every stone susceptible of magnetism, even the magnetic iron-stone itself, does not become magnetic till it is brought up into the air and light; the iron weathercock till it is placed on the steeple, and every rod in general, till it is set upright. In elevated places exposed to the sun, and where the basalt is covered with the mould, ferruginous clay is found in brownish red masses, with granular fracture, sometimes hard, sometimes half hard. Friable brown points, probably of clay iron-stone, and delicate sparkles of pinchbeck brown mica, are scattered in it. The olivin is decomposed into a yellowish brown mass, in which, however, the cleavage is still to be recognised. These red spots of ferruginous clay are distinguishable from the sea, and heighten the variety and vivacity of the picture presented by the lovely mountain island. For the rest, the considerable decomposition of the basalt, which is observable here also, is only apparently in contra-

Edinburgh Philosophical Journal, 1821, p. 221.

diction with the hardness of the stone. The relation of its density, together with the natron it contains, is the most important cause of the great affinity with the water of the atmosphere. It is known that no kind of rock attracts the latter so strongly and so continually as the basalt, which is so remarkably compact; for this reason we so often see its summits veiled in thick clouds, and marshes in its vicinity. The basalt, too, in consequence of its disposition to assume columnar flat, and spherical forms, is more exposed than any other rock, on a thousand points, to the influence of the atmosphere. Hence, and still more by its remarkable composition of silex, clay, lime, talc, natron, oxyd of iron, nay, even muriatic acid, the basalt, more than any other kind of rock, appears like a great voltaic column. This comparison seems more just, if we consider the composition of the single strata of the flotztrap mountain; yet it is still worthy of remark, that the massy undetached basalt related to the amygdaloid, or the wacke, decomposes more readily than that which is separated into pillars, and which is more crystalline.

From one of the highest points of the island, which is covered with the *Pinus canariensis* of Smith, and with ferns, we descended in the evening through several deep ravines, and a thick grove of beautiful laurels and chesnuts, to the solitary

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[*] Kennedy in Gilbert's Annals, vii. p. 426.

church of *Nossa Senhora de Monte*. A broad flight of steps leads to the building, which stands upon a projection of the rock between spreading chesnut trees. The setting sun gilded the sea, and illuminated the more remote parts of the island with a magic light, while the sound of the church bell summoned the wanderer to the shrine. The ground round it is planted, by the pious care of the faithful, with flowering groups of jessamine and honeysuckle, *Fuchsia coccinea*, *Buddleja globosa*, and *Vinca major*. Those foreign shrubs have here found a new country, which they adorn, almost without interruption, with their beautiful flowers. The climate of this happy island equally favours the productions of every zone ; only the European misses his oaks, firs, birches, and willows; but, on the other hand, he beholds with astonishment the yam, *Inhame*, (*Caladium esculentum*,) the egg-plant (*Solanum melongena*), the cactus, aloe, and the potatoe of America, flourish near the corn and fruits from Caucasus; the fig-tree, the sugar-cane, and the pisang of the east; the date-palm, the tomato (*Solanum lycopersicum*), and the cultivated cane (*Arundo donax*) of Africa. It is well known that the sugar-cane was introduced here from Sicily, by the Infant Don Henrique Navegador. If we may depend upon ancient accounts, the refining of sugar was carried on here with great success at a very early period, and at the end of the fifteenth century the greater part of the sugar used in Europe came perhaps from

Madeira.* According to the historian Lemos Faria e Castro, one hundred and fifty sugar-houses (*engenhos*) furnished annually sixty thousand arrobas of sugar as the royal fifth (*quinto*).† But when the far greater fertility of the Portuguese colonies in America was known, the cultivation of the sugar-cane in Madeira gradually ceased. The yam (*inhama*) was brought hither soon after the dicovery of the New World, and is now one the most common articles of food, which is more planted than the potatoe, in sloping grounds, which may easily be watered. When the island was given up to the family of the Da Camaras, as donataries, they began to favour especially the growth of the vine, which was likewise first introduced here from the Grecian archipelago, by Prince Henry. The culture of the vine increased so rapidly, that a hundred and fifty years ago, it was the most important occupation of the inhabitants of the colony. Most of the grapes are white, of a longish shape; and the most esteemed is that called Verdelho.‡ The management of the vines is so far different from that in Portugal that they are planted on stony ground, exposed to the sun, and trained over wooden lattices, several feet high; they form an agreeable arcade, under which you may often walk from one vintner's cottage to another. In the warm climate of the island, the bare black basaltic soil of which imbibes much warmth, and reflects it upon the vines, this mode of cultivation seems to be particularly suitable; whereas it is less successful in colder countries. Thus, for instance, in some parts of Italy, the vine-arbours (*pergole*) do not bear so well as those plants that are wreathed round poles. The vine is cultivated from the sea-coast up to two-fifths of the elevation of the island. The annual produce is estimated at from twenty-five to thirty thousand pipes. The best wine is called malmsey, and is made from a vine which came from Greece.

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* Hartmann Schedel liber Chronicarum. edit. Anton Koburger, 1493, p. 390.

† Historia geral de Portugal. Lisb. 8vo. tom. vi. p. 184.

‡ John Williams, in Transact. of the London Horticultural Society, vol. ii. p. 106.

If our visit to the island had not been limited to a single day, we might, perhaps, have been able to add several interesting particulars respecting its original vegetation, to the excellent observations which Von Buch* has published on the Flora of the Canary Islands, and which might serve as a model for all future investigations into the vegetation of islands in general. The present state of Madeira does not allow us to form perfectly accurate ideas respecting its original vegetation. When Zarco, the discoverer, first viewed the island from Porto Santo, it was covered, from the sea-shore to the top of the highest summits, with almost impenetrable forests, which were not destroyed till after a conflagration which lasted seven years.* Many of the birds peculiar to the island were perhaps destroyed on this occasion. Dragon trees (*Dracæna draco*) of the same kind as the ancient tree at *Orotava*, in Teneriffe, are seldom seen here, and only singly in the gardens. Cultivation has since contributed to banish the native species, and to introduce foreign ones. However, the greatest affinity with the plants of the Canary Islands is still evident; and the several zones of vegetation may be properly characterised, in the same manner as Von Buch has done for those islands. We do not, however, distinguish five different zones, above one another, but only four, the two lowest of which are determined by the peculiarity of the cultivation, and the two higher by the natural state of the vegetation. †

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* In the Essays of the Berlin Academy, 1816 and 1817, p. 337.

Loaded with the treasures of all kinds which we had collected, but exhausted by our great exertions, we returned to the town late in the evening, by a road made between the vineyards. Though the heat, increased by the black basalt rock, had been very oppressive during this excursion, the thermometer, at ten o'clock at night, was only 15.5° R. in the air, and 16.0° in the water; the hygrometer was 42°, and the aræometer, within the harbour, 2.75°, and afterwards, in the open sea, 3°. The frigate having taken on board a considerable supply of the fine wine of the island, and being quite ready to sail, we were obliged immediately to return on board.

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* Lemos Faria e Castro Historia, vol. vi. p. 183. The ancient historians all agree that the first donataries, descendants of Zarco, took the name of Camaras, from a cave in which he had found many sea-wolves (*lobos marinhos*), and which he therefore called *Camara dos lobos*. If they were really sea-lions which then frequented the coast of Madeira, it is remarkable that no traces of this animal are now to be found there.

† See Note 2. page 126.

The 8th of June, in the morning, we weighed anchor, and put out to sea. We were more fortunate on this occasion than the vessel which afterwards conveyed Her Imperial Highness the Crown Princess hither, and which, being driven too near the coast by a sudden squall of wind from the south, was obliged to cut both cables, in order to get out to sea. The depth round the island is so great, that it is only quite close to the shore, in 35 or 50 fathoms water, that a bottom can be found for the anchors, which easily take hold in the basalt rock: hence vessels are frequently obliged to go to sea with the loss of their anchors, particularly from the month of November to February, when storms from the S.W. or S.E. threaten to dash them against the coast. We left the road of Funchal with a faint N. wind, but which soon veered to E. and N.E., and remained favourable all the day. At noon, the centre of the island bore N.E. by N.; our longitude was, according to the calculation of the officers, 19° 27′ W. of Paris, our latitude 31° 47′ 17″. The wind increasing during the night, we were already off the Canary Islands. The next morning Palma appeared, covered with heavy clouds; it is almost always seen enveloped in mists, which is a consequence of the westerly winds that prevail here, and the rains brought by them, which are said to be more frequent here than in any of the other Canary Islands. At noon we saw the south point to the S.E. by E., but thick fogs and a passing shower of rain soon concealed it from our view. An English brig, which had colonists for New Holland on board, passed close by us in this latitude. There was a great number of women among them, who, though banished from their native country, appeared to go with good courage to their new destination. On the evening of the same day we descried the Island of Ferro, but, as usual, enveloped in fog. We had now passed the limit of ancient navigation, from which the enterprising spirit of Bartholomew Diaz, Columbus, Magalhaens, formerly steered to seek a new world; and, confiding in human art and science, we proceeded across the boundless expanse of the ocean to the destination of our voyage. If the sojourner in the small and frail vessel feels himself seized with shuddering, at the view of the immense agitated element, yet when he contemplates the skilfully constructed edifice, triumphing over the air and water, steadily pursuing its course, he is lost in wonder at the greatness and the power of human invention. The improvement of navigation and ship-building in our times, inspires the voyager with a sense of comfort and security, and banishes every idea of danger. In this manner we, too, on board an admirably well-built vessel, guided with prudence and science, surrounded by a company well calculated for mutual pleasure and instruction, became acquainted with the most agreeable part of a seafaring life. In the alternate occupations of cards, music, and literary employments, the hours passed as rapidly as our swift-sailing vessel glided over the waves.

The trifling thunderstorms and gusts of wind, quickly rising and passing away, which, from this time now and then occurred, appeared merely to diversify the uniformity of our mode of life, since, at once sublime, and threatening danger, they excited various emotions. Exactly in the latitude of Ferro, a sudden squall broke and threw down several yards, by which some sailors were hurt, but no other unpleasant consequence ensued. In the vicinity of those beautiful islands, which even the ancients distinguished by the name of the Fortunate, the naturalists, in particular, felt a secret wish that some favourable opportunity would occur to land upon one of them. We should have been very happy to have had a nearer view of the Peak; and should have felt great interest in examining, among other curiosities, the remains of the Guanches, who, according to our later observations, agree with the negroes in their slender forms, thick lips, and broad flat noses; but, by their sharp projecting cheek-bones, and long smooth hair, have more resemblance to the ancient Egyptians. The wind, however, drove us with increased rapidity past this delightful group of islands. In a few days we were in the latitude of Cape Verd. On the evening of the 14th of June, we descried the Island of Boa Vista, which appeared like a long and rather low land; the most southern point of the island bore N. by W. twelve miles distant. None of the other islands were visible, the sky being covered the whole day with grey clouds. In the channel, between the Cape Verd Islands and the continent of Africa, a thick white fog* prevails for the greater part of the year, particularly near the coast, and probably arises from the combination of the exhalations from the sea, with the impalpable dust brought by the N.E. wind from the neighbouring sandy desert; besides this, the islands themselves, that lie scattered about in this quarter, may, perhaps, contribute to collect and condense the vapours rising from the ocean. Navigators, therefore, seldom have a pure sky for their observations in this channel; and they now prefer, on the voyage to the Cape, New Holland, India, and America, to steer to the west, in sight of the islands; whereas, earlier voyagers kept close to the continent. Those ships which go through the channel keep in longitude

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* Horsburgh's India Directory, London, 1817, 4to. vol. i. second edit. p. 11.

19° and 20° W. of Greenwich; and, during the months in which the sun is in the south, find it advantageous to hold near the continent, where northerly winds usually blow. By this means they avoid the shoal called *Banco de Porgas*, the existence of which, however, has lately been called in question; as also, the dangerous reef (query, of coral?) Boneta, which is said to lie two miles E. by N. of the most northern point of Boa Vista.

The nearer we approached the Cape Verd Islands, the more different did the character of the elements become. Even in the latitude of the Canaries, we experienced rapid changes in the temperature of the air, and those sudden distinct gusts and whirlwinds which are here frequently observed. It was not till about the 11th or 12th of June, in the longitude of 21° 51′ W. of Paris, when we crossed the tropic of Cancer, beyond those islands, that the N. and E. wind which had hitherto alternated, united in a N.E., and afterwards in a N.N.E. wind, which blew day and night with equal strength towards the equator; with this steady N. E. wind we made a hundred and fifty miles in four and twenty hours. We perceived a similar change in the temperature of the air and water, as in the saltness of the sea, and other natural phenomena. North of the tropic the temperature of the air changed day and night, always differing at least one degree from that of the water; but now there was a smaller difference, and alternately an almost equal decrease and increase; in the same manner the instrument always indicated a constant decrease in the saltness of the sea, but so, that here too, the water taken from some depth was more salt than that at the surface. The moisture of the air, on the other hand, had greatly increased; and excepting the hot and dry noon, the hygrometer, especially in the morning and evening, indicated the greatest relaxation, which was sensibly felt in frequent clammy dews. Here, in the torrid zone, the sea of an indigo blue colour, rolled in uniform waves, and began to shine generally, and with great splendour, during the night, a phenomenon which we had hitherto seldom observed. This magnificent appearance, the frequent lightnings, and innumerable falling stars, together with the greater sultriness of the air, seemed to indicate a higher degree of electricity in the element, though the electrometer, in the prevailing moisture of the air, showed rather less electricity than before. A striking change gradually took place about ourselves, which affected our own persons, as well as the surrounding objects; our satellite, the shadow, at noon grew less and less, and withdrew between the feet, as if in this part of the creation everything became more independent. This is the latitude in which the flying-fish (*Exocœtus volitans*) appear in shoals on the surface of the sea, and present an entertaining sight to the solitary observer. To avoid the vessel under sail, and the fish of prey, they rise sometimes singly, sometimes in shoals, several feet above the surface of the water, into which they fall again after a flight of forty or fifty paces, in a direction contrary to the wind; sometimes they are cast by the wind upon the quarter-deck, where they are taken by the sailors. Their enemies, the tunny fish (*Scomber Thynnus*) and bonitoes (*Sc. Pelamis*), rival in velocity the ship in full sail. They show incredible strength in swimming, for they are able in the midst of their most rapid course, to leap perpendicularly above the surface, and plunge again head foremost into the waves. They were here so numerous, that the crew were able to procure a constant supply for our table by harpooning them, or taking them with strong hooks, to which a bunch of feathers, in imitation of a flying-fish, was tied. The largest of these fish which we took on board, weighed seventy pounds.

After we had entered this region of peace and tranquillity, between the tropics, the cushions, which were before placed round the tables, to prevent the glasses, bottles, and plates from falling down, were taken away, and the seamen looked forward to a smooth and safe passage. Our ship, carried on by the regular wind, sailed day and night with equal rapidity, and the sailors found on this passage, which resembled a party of pleasure, leisure enough for games and amusements. They conceived an idea of making a theatre of puppets; and the wanton Policinello, the pedantic Doctor, and the lively Colombine appeared, ridiculously enough put together. This agreeable mode of life suffered only one interruption; this was in latitude 8° 12′ N., when we descried at a distance a large ship, whose movements appeared suspicious. These seas are so much infested by privateers from Buenos Ayres and North America, that Portuguese and Spanish ships in particular must be upon their guard: these pirates, however, do not even spare English ships; which was experienced by Count V. Wrbna among others, who, returning as express from Rio de Janeiro, in an English packet-boat, was attacked and plundered, and even in danger of his life. On the sight of that ship, the necessary preparations for defence were made; but we soon found, from the course which it steered towards the coast of Africa, that it had no hostile intention. It was probably a Portuguese slave ship, bound for Guinea.

While the co-operation of the elements became more and more harmonious, the starry firmament began also to appear more and more in equilibrium to the inmates of the little vessel. On the 15th of June, in latitude 14° 6′ 45″, we beheld, for the first time, that glorious constellation of the southern heavens, the cross, which is to navigators a token of peace, and according to its position, indicates the hours of the night. We had long wished for this constellation, as a guide to the other hemisphere; we therefore felt inexpressible pleasure, when we perceived it in the resplendent firmament. We all contemplated it with feelings of profound devotion, as a type of salvation; but the mind was especially elevated at the sight of it, by the reflection that even into this region, which this beautiful constellation illumines, under the significant name of the cross, the European has carried the noblest attributes of humanity, science and Christianity, and impelled by the most exalted feelings, endeavours to spread them more and more extensively in the remotest regions.

In proportion as the southern firmament rose above our horizon, that of the northern hemisphere sunk below it. Those who considered Europe exclusively as their country, looked with painful sensations on the polar star, as it sunk lower and lower, till it at length vanished in the thick mist of the horizon. The further we advanced to the south, the N.E. wind gradually abated, and alternated with fainter winds from the N. or E. In 10° 30′ N. latitude, and longitude 23° 15′ W. of Paris, the wind entirely ceased, and a majestic repose reigned in the air and water. While we remained in this region of calms, the thermometer was on an average at half-past six in the morning, in the shade 21.50° R., in the water 22.00°; at half-past seven, in the shade and in the water 22.00°; at noon, in the sun 24.75°; in the shade and in the water 22.50°; in the evening at half-past eight, in the air and water 22.50°; at nine o'clock, in the air 22.00°, in the water 22.50°, in water taken from the depth of 200 fathoms 21.50°; the aræometer in water taken from the surface 2.75°, and later 2.50° to 2.25°; from the depth of 200 fathoms 2.50°; the hygrometer stood between 54° and 64°; the barometer at 28°; the variation of the magnetic needle between 13° 48′, and 12° 48′ W.

In these seas the sun rises from the ocean with great splendour, and gilds the clouds accumulated in the horizon, which in grand and various groups seem to present to the eye of the spectator, continents with high mountains and valleys, with volcanoes and seas, mythological and other strange creations of fancy. The lamp of day gradually rises in the transparent blue sky; the damp grey fogs subside; the sea is calm or gently rises and falls, with a surface smooth as a mirror, in a regular motion. At noon a pale, faintly shining cloud rises, the herald of a sudden tempest, which at once disturbs the tranquillity of the sea. Thunder and lightning seem as if they would split our planet; but a heavy rain of a salt taste, pouring down in the midst of roaring whirlwinds, puts an end to the raging of the elements, and several semicircular rainbows, extended over the ocean like gay triumphal arches, and multiplied on the wrinkled surface of the water, announce the peaceful termination of the great natural phenomenon. As soon as the air and sea have recovered their repose and equilibrium, the sky again shows its transparent azure;

swarms of flying-fish rise sporting over the surface of the water, and the many-coloured natives of the ocean, among which is the shark, with his two inseparable companions (*Gasterosteus Ductor* and *Echeneis Remora*), come up from the bottom of the element, which is transparent to the depth of a hundred fathoms. Singularly formed Medusæ, the bladder-shaped *Physalis* with its blue pungent filaments, serpent-like streaks of Salpæ joined together, float carelessly along; and many other little marine animals, of the most various kinds, pass slowly, the sport of the waves, by the motionless vessel.* As the sun gradually sinks in the clouded horizon, the sea and sky assume a new dress, which is beyond description sublime and magnificent. The most brilliant red, yellow, violet, in infinite shades and contrast, are poured out in profusion over the azure of the firmament, and are reflected, in still gayer variety, from the surface of the water. The day departs amidst continued lightning in the dusky horizon, while the moon, in silent majesty rises from the unbounded ocean into the cloudless upper regions. Variable winds cool the atmosphere; numerous falling stars, coming particularly from the south, shed a magic light; the dark blue firmament, reflected with the constellations on the untroubled bosom of the water, represents the image of the whole starry hemisphere; and the ocean, agitated even by the faintest breeze of the night, is changed into a sea of waving fire.

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* See Note 3. page 129.

Great and glorious are the impressions which the stranger here receives of the power and peace of the elements; but unused to the torrid zone, he feels a disagreeable sensation from the moisture and coolness of the morning and evening, and the oppressive heat of the noon. The whole crew, therefore, began to complain, in this latitude, of head-ach and cholic; and only artificial means, such as tartar and rhubarb, could prevent disease, in a climate where the rays of the sun fall perpendicular. At length we came, though slowly, out of this region of sultry and wearisome calm, because the wind which blew after the thunderstorms at noon, always carried the ship a little forward; by degrees, too, a faint south wind arose, varying from S.E. to S.W., and diminished the temperature, in the morning, at 7 o'clock, in the air, to 20.75° R., in the water to 22°; at noon, in the air, to 21.50°, in the water to 22°; in the evening, at half-past seven, in the air, to 21.25°. When we had reached longitude 21° 21′ west of Paris, and 5° 28′ N. latitude, the wind began to blow more steadily from the S., and fixing in S.E. and S.S.E., formed the constant wind, which blowing regularly, accompanied us through these latitudes. We still saw for a moment the polar star, a few degrees above the horizon, which is here generally clouded; on the other hand the cross, and the other constellations of the southern hemisphere, were likewise low. From this, as well as from the nautical observations, we knew that the equator was still some degrees to the south of us; but the uniformity and harmony in the phenomena of nature, which we had observed between the 10th and 5th parallels of latitude, seemed again to decrease, and thus to prove that the line of culmination of those phenomena is not in the equator, but several degrees to the north of it. We must leave it to the natural philosopher and the astronomer to decide whether this, perhaps, may arise partly from the heavier mass of continents, from the nutation, or from the revolution of the earth round the sun, &c. It is remarkable in this respect, that the N.E. and S.E. trade winds do not cease at an equal distance from the equator. The trade winds, which are supposed to arise from the rotation of the earth round its axis, and from the current of colder air towards the warmer region between the tropics, regularly vary in their extent, according to the position of the sun. When it is in the southern torrid zone, the N.E. wind always blows towards the equator; when it is in the northern torrid zone, the S.E. wind blows nearer to, nay, even beyond it. Between the two trade winds, there are sometimes faint winds, especially from S. and S.S.W. which are more limited by the first, sometimes on the north and sometimes on the south. The boundary of the N.E. trade winds in the Atlantic ocean towards the equator, was stated by John Seller* so long ago as the year 1675; they cease, he says, in January, February, and March in 4°, in April in 5°, in May in 6°, in June in 8°, in July in 9°, in August in 11°, in September in 10°, in October in 8°, in November in 6°, in December in 5° north latitude, and these statements are confirmed by modern observations

Carried forward by the S. E. wind almost as rapidly as we had been before by the N. E., we sailed towards the equator. On the 28th of June, being in 2° 19′ 29″ north latitude, and 24° 21′ west longitude of Paris, we saw several tropical birds (*Phaëton æthereus*) and pelicans (*Pelecanus aquila*) hovering at a great height over the frigate. These birds can indeed repose upon the waves; but it is not usual for them, especially the last, to show themselves, except when the land is not too far distant. As we were in the middle of the ocean, we naturally concluded that there must be some rocks in the neighbourhood: in fact we found such rocks marked on some of our charts, in the longitude in which we were to cross the equator. In the evening the captain thought we had already passed this danger, when about nine o'clock the man at the mast head suddenly cried, "Breakers a-head!" At this cry, all rushed in despair upon deck, and ran confusedly together; some called "Fire!" and others,

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* J. Horsburgh's India Directory, p. 26.

"Shipwreck!" The captain, however, did not lose his coolness and presence of mind, but immediately ordered the sails to be struck. The vicinity of the supposed danger gave wings to the sailors, and the ship was speedily turned aside from the rocks. Thus we had indeed happily escaped the danger, and every one breathed more freely after a moment which had so powerfully affected us all by the image of impending destruction; however, to sail with greater security during the night, it was thought necessary to put out a small boat to examine the supposed rock. The question now was, whether any of the officers would expose himself in so small a bark to the immense agitated ocean. Lieutenant Logodetti, obeying the summons of the captain, came forward; and accompanied by some sailors, provided with a compass, a lighted lantern, and some provisions, went on board the boat to proceed towards the supposed breakers. While this was passing, the moon broke forth from the clouds and shed its light on the sea, ruffled by the S.E. wind. The whole crew of the ship, which with only a few sails set, had till now sailed on another tack, looked with anxious expectation at the boat, whose course was indicated by its lantern. We were all uneasy about the fate of our companions who were exposed in a small open boat to the ocean, perhaps to a near rock; sometimes we saw the distant light vanish, then its re-appearance filled us with joy, but at length we lost sight of it all at once, and it seemed to have disappeared entirely. While we were indulging in the most various conjectures, the boat rowed happily through the night, constantly attentive to the supposed danger, and returned safe the next morning to the frigate, with intelligence that the fancied breakers, arose merely from the agitation and the reflection of a violent current.

Such currents, setting to the west, which probably depend on the revolution of the earth round its axis, as well as on the constant east winds, prevail from 27° west longitude of Greenwich almost the whole year through, from the equator to the fourth and fifth degree of northern latitude, and also, though less constantly, in the lowest southern latitudes. Ships bound to the south which cross the equator too far to the west, are carried by them towards Cabo de S. Roque in Brazil, and suffer a considerable loss of time, because it is very difficult to pass round that cape to the south, against the current setting to the north. Besides this current about the Cabo de S. Roque, a pretty regular one has been observed along the eastern coast of Brazil, which depends on the direction of the wind. In September, and the following months till March, winds from the N. by E. to N.E. by E. prevail; and in the months from March to September, on the other hand, those from the E. by N. to E.S.E.; and in conformity with this change of the winds, a current runs to the north from March to September, and to the south from September to March.* On account of these currents, many vessels bound to the southern parts of Brazil, or to Buenos Ayres, visit the stations of Pernambuco and Bahia in the winter months on the passage out, and in the summer months on the voyage home. As the land wind generally blows strong, and to a considerable distance from the coasts of Brazil, it essentially favours vessels steering southwards, and they may reckon upon a speedy voyage along the coast, if they have not too nearly approached the land in the latitude of 6° or 7°. The longitude at which the equator is crossed on these voyages, is different; it is not advisable to keep too near the African coast on account of the currents and the calms prevailing there. In the English navy, the longitudes between 18° and 23° west of Greenwich are considered the best for crossing the equator, and it is also thought best to steer more to the east, when the sun is in the north, and more to the west when it is in the south.

It was on Sunday, the 29th of June, that according to our ship's reckoning we were to cross the equator. As the sea was pretty calm, mass was celebrated on this day. The solitude of the place, the silence and grandeur of the element to which the little vessel was confided, between the two hemispheres and in the middle of the vast ocean, could not fail in the moment when the transubstantiation was announced by the sound of the drum, profoundly to affect every mind, but particularly those who then reflected on the power of Providence in nature, and on the mysterious metamorphosis of all things. The day passed over quietly with a constant S.E. wind; even Neptune and his strange retinue were not allowed to excite a disturbance on board the ship, by the usual ceremony of baptising those who crossed the line for the first time. The night was bright and clear; the poles of the heavens were already resting on the horizon, and the full moon hung above our heads in glorious majesty; Vega, Arcturus, Spica, Scorpio, in which Jupiter just then shone, and the feet of the Centaur, were bright in the firmament; the southern Cross had attained a perpendicular position indicating the hour of midnight, when, according to calculation we were at the place where heaven and earth were in equilibrium, and crossing the equator steered into the southern hemisphere. With what ardent hopes, with what inexpressible feelings did we enter this other half of the world, which was to present us with an abundance of new scenes and discoveries! Yes, this moment was the most solemn and sacred in our lives. In it we saw the longings of earlier years accomplished, and, with pure joy and enthusiastic foreboding, indulged in the foretaste of a new world so rich in the wonders of nature.

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* Sailing directions for the eastern coasts of Brazil, by John Purdy. London, 1818. 8vo. p. 2.

It was not till we had passed the equator, that the constant S.E. wind began to equal in strength the N.E. wind of the northern hemisphere. Violent rains were less frequent, but in their stead insulated groups of clouds of various forms were piled up in the blue ether. The nights, on the other hand, were more serene, and the southern constellations, new to us pilgrims from the north, though far inferior in number and splendour to those of the north, shone brightly in the azure firmament. Falling stars illumined the night more frequently than in the northern zone, and generally fell towards midnight in the south, and towards morning in the north-east. The temperature of the water, still more that of the air, appeared to become considerably lower than in the same northern latitude, but the moisture of the air, and the phosphorescence and gravity of the sea-water began to increase. Our frigate rapidly cut the deep blue waves of the southern ocean, which, as they dashed against the stern, fell, on cloudy days, in numerous rainbows, or in the night, filled with countless luminous animals (*Noctiluca oceanica nob.*), shone like sparkling fire. Here, too, as in the northern torrid zone, swarms of flying-fish flew around, and the swift tunny-fish kept pace with our vessel. The sun appearing in a glow of red behind thick mists, or the pale moon, afforded us a majestic prospect when they rose or sunk into the ocean. But the farther we advanced to the south, the more perceptible was the difference of the elements. In 13° 29′ south latitude, and 31° 37′ west longitude of Paris, the thermometer, at half-past seven in the morning, was in the air at 19.50° R., in the water 20°; at noon, in the air and water 20°; in the evening at half-past seven, in the air 19.25°, in the water 19.75°; the hygrometer 61° to 70°; the aræometer 2.87° to 3°; the barometer 28° or 27.7° to 27.9°.

In latitude 18° 4′, and longitude 35° 20′, the warmth of the atmosphere decreased nearly one degree, and the thermometer varied between 17° and 18°. We were now in the latitude of the Abrolhos, and the appearance of several sea-fowls (the *Phaëton æthereus* and the *Procellaria capensis*) indicated the vicinity of those dangerous rocks which lie along the coast of Brazil between the 16th and 19th degrees of south latitude. The captain ordered soundings to be more frequently taken; and though no bottom was found at a less depth than seven hundred feet, he judged it prudent to keep farther off the coast during the night. The small coasting vessels which sail backwards and forwards during the whole year between Bahia and Rio de Janeiro, do not always keep to the east of that dangerous chain of shallows and cliffs, but, when the wind is not favourable to carry them out to sea, often remain very near the coast where they can safely pass the channel, which is twelve miles broad, between the four small rocky islands Ilhas Abrolhos. This very frequent navigation has caused the Portuguese coasters to examine a series of shallows from nineteen to fifty fathoms, which, beginning to the south of Bahia de todos os Santos, extend along the coast of the Comarca dos Ilheos from the Baixos de S. Antonio to the mouth of the Rio Grande, in the direction of S.S.E., are connected with the Abrolhos, properly so called, and stretch from their most easterly end in 18° 38′ to 40° south latitude, and 36° west longitude of Greenwich, towards the S.E. to the rocky islands of Trinidad and Martin Vas. One of the sea-faring people with whom we became acquainted at Bahia, compared the formation of the rocks of Trinidad to those of Madeira and the Canaries. He was full of the impressions which had been left upon his mind by the grandeur and boldness of the masses of rock there, which, destitute of vegetation, except at the foot, rise perpendicularly out of the ocean, but above all an immense rocky arch under which the sea breaks with great fury. It is, however, very seldom that Portuguese vessels go from the Brazilian coast as far as this longitude, and anchor near these inhospitable cliffs to take in water, or to catch turtle which are said to be very numerous there. A French ship which left Europe almost at the same time as ourselves, having become leaky by some negligence in stowing its cargo of oil of vitriol, took refuge on Trinidad. The crew sent the long boat to ask assistance at Rio de Janeiro, but before it arrived they were delivered from this fearful solitude by a North American who took them on board and landed them on the Cape of Good Hope. A disagreeable though by no means alarming circumstance occurred to us here; a servant on board carelessly emptied into the sea the vessel in which several specimens of the *Proteus anguinus*, which we had brought from the lake of Ziriknitz, had hitherto remained alive and unchanged, and we were thus deprived of the result of the whole observation of the continued influence of the tropical climate on the development of these enigmatical animals.

On the 10th of July, when in 20° 49′ south latitude, and 39° 24′ west longitude of Greenwich, we quitted the region of the western variation of the magnetic needle, which had regularly decreased since our departure from Europe, and entered that of the eastern. The thermometer now began to fall gradually from 18°, 17°, to 16°. On the following day we met a small vessel, the first which had come so near us in the ocean that we could hail her. On our firing a gun and hoisting our colours, it hastened up and gave us the agreeable information that the insurrection at Pernambuco, of which we had heard at Gibraltar, had been immediately quelled, and that political tranquillity and order had not been at all disturbed in the rest of the kingdom. It stated its distance from the continent, to be two days sail from Cabo Frio, and steering rather more westward towards the coast, soon vanished out of our sight. The astronomical calculations, which differed only about twenty miles from the result given by the log, made us, in agreement with the statement of this vessel, on the 12th of July at noon, in 21° 44′ south latitude, and in 40° 45′ west longitude of Paris. On the evening of the 13th of July, the captain announced that we should see Cabo Frio the following morning. How ardently did we long for the moment when, after a voyage of two and forty days, we should again come in sight of a continent. The assertion of the captain proved correct; and on the 14th, in the morning, a long-extended chain of mountains, floating as it were in mist, appeared in the west. The deceiving clouds were gradually dispelled, and we perceived more clearly in the remote distance, the woody chain of Cabo Frio, which was joyfully hailed, first by the man at the mast head, and then by all on board.

The day was delightfully serene and bright, and a favourable wind carried us past the lofty cape, and soon after the noble entrance of the bay of Rio de Janeiro, though still at a distance, opened to our view. Steep rocks, like portals to the harbour, washed by the waves of the sea, rise on the right and left; the southern, Pâo d'açucar of the form of a sugar-loaf, is the well-known guide for ships at a distance. Towards noon, approaching nearer and nearer to the enchanting prospect, we came up to those colossal rocky portals, and at length passed between them into a great amphitheatre, in which the mirror of the water appeared like a tranquil inland lake, and scattered flowery islands, bounded in the back ground by a woody chain of mountains, rose like a paradise full of luxuriance and magnificence. Some naval officers from the fort of Santa Cruz, by which our arrival had been announced to the city, brought us permission to sail farther in. While this business was transacting, the eyes of all feasted on a country, which, for beauty, variety, and splendour, far exceeded all the natural beauties which we had ever beheld. The banks in bright sunshine rose out of the dark blue sea; and numerous white houses, chapels, churches, and forts, contrasted with their rich verdure. Rocks of grand forms rise boldly behind them, the declivities of which are clothed in all the luxuriant diversity of a tropical forest. An ambrosial perfume is diffused from these noble forests, and the foreign navigator sails delighted past the many islands covered with beautiful groves of palms. Thus new, pleasing, and sublime scenes, alternately passed before our astonished eyes, till at length the capital of the infant kingdom, illumined by the evening sun, lay extended before us; and we, having sailed past the little island das Cobras, cast anchor close to the city at five o'clock in the evening. A sensation, not to be described, overcame us all at the moment when the anchor struck the ground of another continent; and the thunder of the cannon, accompanied with military music hailed the desired goal of the happily accomplished voyage.

NOTES TO CHAPTER IV.

NOTE 1.

THE Dyer's Lichen was first exported from the islands of the Archipelago to Venice, Genoa, France, and England, for the use of the dyers. Towards the commencement of the last century it was discovered in the Canary Islands, and was soon placed among the regalia of the Spanish crown. This excited the attention of the Portuguese, who collected it without restriction in the Cape de Verd Islands, Madeira, Porto Santo, and the Azores. In the year 1730, the Jesuits asked of King John V. the privilege of collecting the *Hervinha secca*; but the crown took the advantage into its own hands, and farmed the right of collecting it. At a later period the Lichen was ceded to the mercantile company of *Gram Pará* and *Maranhão*; and, lastly, in the year 1790, the government again took this branch of commerce under its own care, because it had declined considerably under the bad management of the company. At present the exportation is small; but more considerable, however, from the Cape de Verd Isles. (See I. Da Silva Feijó, in the *Memorias economicas da Acad. de Lisboa*, vol. v. 1815, p. 143.)

Note 2.

Mr. Von Humboldt (Travels, vol. i.) was the first who distinguished in the vegetation of Teneriffe five zones, one above the other: the first, that of the vine, extends from the sea-shore to the elevation of from two to three hundred toises; the second, that of the laurel, reaches from this to the height of nine hundred toises; then comes that of the pines, four hundred toises in breadth; the fourth, of the broom (*Spartium nubigenum*); and lastly, that of the grasses. Von Buch (on the Flora of the Canary Islands, in the Memoirs of the Berlin Academy, 1816, 1817,) in like manner distinguishes five regions of vegetation in the islands of Teneriffe, Canaria, Palma, Gomera, and Ferro; the great elevation of which above the sea implies various zones of climate. We endeavour to point out the same divisions or zones in Madeira; in which we assume, for the middle temperatures, with the exception of those well known in the lowest zone, the results of Howard's calculation, according to which the temperature decreases 1.2 cent. for every 106 toises as you recede from the surface of the earth. The four forms of vegetation to be observed in Madeira, correspond with those in the Canaries, but are of inferior breadth.

FIRST REGION.

The Canaries: African Zone of the Cactus and Euphorbia, one thousand two hundred feet above the surface of the sea; mean temperature 21.25° to 21.50° cent.

Madeira: Zone of the Tropical Plants, seven hundred feet above the surface of the sea; mean temperature 20.40° cent.

The chief character is now determined by plants imported from hot climates, and cultivated, such as, Musa Paradisiaca, Musa sapientum, Caladium esculentum, Cactus Tuna, Opuntia, Convolvulus Batatas, Agave Americana, from America.—Physalis Peruviana, Sida carpinifolia, Abutilon, Melochia pyramidata have likewise been introduced here from the American continent. — Arundo Donax (perhaps native?), Phœnix dactylifera, Olea Europæa, Ceratonia Siliqua, Punica Granatum, Ficus Carica, brought from North Africa, or Southern Europe.

SECOND REGION.

The Canaries: European cultivation, from one thousand two hundred to two thousand five hundred feet; mean temperature 17.50° cent.

Madeira: Zone of the Vine, Fruit, and Corn, from seven hundred to two thousand three hundred feet; mean temperature 17.02° cent.

The greater part of the plants living here, as well as the vine and corn, seem to have been brought from Asia and the South of Europe. (Those species belonging to the North of Europe are printed in small Roman characters; those of the South of Europe and North Africa, in *Italics*; and those peculiar to the Canaries and Madeira, in *ITALIC SMALL CAPILALS*.)

Carix muricata; Scirpus setaceus; Poa pratensis; Briza media, *maxima*; *PHALARIS CANARIENSIS*; Glyceria fluitans; *Andropogon hirtum*; Brachypodium pinnatum, *distachyum*; Agropyrum repens; Hordeum murinum; Triodia decumbens; *ACHYRANTHES NIVEA*; *CHENOPODIUM AMBROSIOIDES*; Urtica urens; Plantago major; Echium vulgare; Solanum nigrum, *PSEUDOCAPSICUM*; Sherardia arvensis; Sonchus oleraceus; Cripis tectorum, *CORONOPIFOLIA*; *Scolymus maculatus*; *Calendula arvensis*; *Cichorium* *divaricatum*; *Centaurea Calcitrapa*; Convolvulus arvensis, *althœoides*; Mentha Pulegium, rotundifolia; *Stachys circinata*; Prunella vulgaris; *Origanum glandulosum*; Amaranthus Blitum; Dianthus prolifer; Arenaria verna; Cucubalus Behen; Alsine media; *Oxalis corniculata*; Portulaca oleracea; Geum urbanum; Rubus fruticosus; Ranunculus repens; Agrimonia Eupitorium; *Valeriana Phu*; *Anethum Fœniculum*; Raphanus sativus; Brassica orientalis; Turritis hirsuta; Geranium robartianum; Lotus corniculatus, *microcarpus*; Trifolium agrarium; *Sedum dasyphyllum*; *SIDA CANARIENSIS*; *Lonicera Periclymenum*; *BUDDLEJA GLOBOSA*; *Philadelphus coronarius*.—From America: Fuchsia coccinea.

THIRD REGION.

CANARIA: Zone of the Woods, from two thousand five hundred to four thousand and eighty feet; mean temperature 13.70° cent.

MADEIRA: Zone of the Woods, from two thousand three hundred to three thousand feet (sometimes very rocky); mean temperature 15.06° cent.

Most of the plants peculiar to Madeira are in this zone.

Castanea vesca; *LAURUS FŒTENS, INDICA*; *DISANDRA PROSTRATA*; *RUSCUS ANDROGYNUS*; *PHILLIS NOBLA*; *SEMPERVIVUM ARBOREUM, CANARIENSE, VILLOSUM*; *GLOBULARIA LONGIFOLIA*; *CLETHRA ARBOREA*; *MYRICA FAYA*; *HYPERICUM FLORIBUNDUM*, *Androsæmum*, humifusum; *JASMINUM ODORATISSIMUM*; *SCROPHULARIA BETONICÆFOLIA, GLABRATA*; *DRACOCEPHALUM CANARIENSE*; *MESSERSCHMIDTIA FRUTICOSA*; *TEUCRIUM CANARIENSE*; *LAVANDULA PINNATA*; *CHEIRANTHUS MUTABILIS*; *CETERACH CANARIENSE*; *WOODWARDIA CANARIENSIS*; *DAVALLIA CANARIENSIS*; Blechnum boreale; Carex divulsa; *CHRYSANTHEMUM PINNATIFIDUM*;

Mentha sylvestris; Geranium rotundifolium; *Melissa Calamintha.*

FOURTH REGION.

CANARIA: Zone of the Canary Pine, from four thousand and eighty, to five thousand nine hundred feet, mean temperature 10° cent.

MADEIRA: Zone of Broom and Heath, from three thousand, to five thousand two hundred and fifty feet, mean temperature 10.76° cent.

Cytisus divaricatus; Spartium scoparium; *Erica scoparia* (which extends to the highest rocks); Pteris aquilina; Aira caryophyllacea; *Piptatherum paradoxum; ECHIUM CANDICANS; SEMPERVIVUM VILLOSUM; AIZOON CANARIENSE,* which, as well as the *Cotyledon Umbilicus,* may be seen everywhere on the rocks from the second region upwards.

NOTE 3.

We observed the following animals in the vicinity of the equator. AVES: Phaëton æthereus; *Pelicanus* Aquilus. PISCES: *Squalus* Carcharias; *Gasterosteus* Ductor; *Echeneis* Remora; *Exocœtus* volitans; *Scomber* Thynnus, Pelamis. INSECTA: *Hydrometra* marina *nob.* MOLLUSCA: *Salpa connata nob.*, cristata, cylindrica, dipterygia *nob.; Physalis* pelagica; *Glaucus* octopterygius, ventricosus, Draco *nob.; Porpita* nuda? *Botellus* pellucidus *nob.; Medusæ* sp. div.; *Noctiluca* oceanica *nob.*

The new Hydromatra, and the new genera and species of Mollusca, will appear in a separate treatise.

NOTE 4.

Horsburgh, in the India Directory, has stated in the following table, the equatorial boundaries of the N.E. and S.E. trade wind between 18° and 26° west longitude from Greenwich, according to the experience of 238 ships which have sailed from England to India, or from thence to England.

Months.	The N.E. Wind lost in the Voyage Out, in Latitude		The N.E. Wind met with in the Voyage Home, in Latitude		Mean Limit of the N.E. Wind on the Voyage Out and Home.	The S.E. Wind lost in the Voyage Home, in Latitude		The S.E. Wind met with in the Voyage Out, in Latitude		Mean Limit of the S.E. Wind on the Voyage Out and Home.	Difference between the two mean Limits of the N.E. and S.E., in which variable Winds prevail.
	Between	Mean	Between	Mean		Between	Mean	Between	Mean		
January.....	5°—10°n.	7°n.	3° — 6°n.	4½°n.	5¾° n.	½°—4°n.	2¼°n.	2° —4°n.	3°n.	2¾°n.	3°n.
February...	5 —10	7	2 — 7	5	6	2 s.—3	1½	0½ —1	1	1¼	4¾
March	2½— 8	5½	2 — 7	5	5⅛	1 —2	1	0½ —2½	1½	1¼	3¾
April	4 — 9	6	4 — 8	5½	5¾	2 —2½	1	0 —2½	1½	1¼	4½
May.........	5 —10	7	4½— 7	6	6½	1 n.—4	2½	0 —4	3	2¾	3¾
June.........	7 —13	9	7 —12	9	9	1 —5	3	0 —5	3	3	6
July	8½—15	12	11 —14	12	12	1 —6	4	1 —5	3	3½	8½
August......	11 —15	13	11 —14½	13	13	3 —5	4	1 —4	2½	3¼	9¾
September..	9 —14	11½	11 —14	12	11¾	2 —4	3½	1 —3	2	3	8¾
October.....	7½—13	10	8½—14	10	10	2 —5	3	1 —5	3	3	7
November..	6 —11	9	7 — 0	7	8	3 —4	3½	3 —5	4	3¾	4¼
December..	5 — 7	6	3 — 6	5	5½	1 —4	2½	1 —4½	4	3¼	2¼

TRAVELS IN BRAZIL.

BOOK II.

CHAPTER I.

STAY IN RIO DE JANEIRO.

On the morning of the following day, the 15th of July, we went on shore, rowing through the busy crowd of European vessels, and little boats manned with negroes and mulattoes. Ascending the slope of a very fine molo (quay), of hewn granite, we were at once in the principal square of the city, which is formed by the royal palace and several considerable private buildings. It was with great difficulty that we made our way through the noisy crowd of black, brown, half-naked men, who, with the importunity which is peculiar to them, offered their services. Passing through several straight streets, crossing each other at right angles, we at length reached the Italian inn, at that time the only one in the capital of Brazil, where we found accommodation for the present. Some days afterwards, we hired a small house in the suburb of St. Anna, which we preferred on account of its elevated situation, on the declivity of some hills, and the prospect which it afforded over Cape Corcovado. Our books, instruments, and other effects, were conveyed to our new abode on the shoulders of negroes. The officers at the custom-house made no difficulties, and gave us no trouble, when they found that we had come in the Austria frigate, and under the protection of his majesty the Emperor of Austria. In general, many circumstances appeared to combine to aid us novices in our first domestic arrangements on American ground. To our great satisfaction we soon met with the very obliging M. Von Langsdorff, the Prussian consul-general, who is well known in the literary world by his account of the voyage round the world, in which he accompanied Commodore Krusenstern. He welcomed us with the greatest cordiality; and several of our German fellow-countrymen, who had settled at Rio de Janeiro with mercantile views, endeavoured to serve us to the utmost of their power. Besides our common country, we were united with them by the interest which they felt in the ample treasures of nature with which they were so imperfectly acquainted. In justice to our own feelings we must gratefully mention the names of our worthy countrymen, Messrs. Scheiner, Hindriks, Schimmelbusch, Deusson, Fröhlich, and Dürming. We also received most friendly counsel in the regulation of our affairs from Messrs. Von Eschwege and Feldner, lieutenant-colonels of engineers in the service of the King of Portugal. A residence of several years in Brazil had made them both very well acquainted with the interior of the country, and the former happened to be just then at Rio de Janeiro, whither he had come on a visit from his garrison at Villa Rica. By the intervention of the Austrian minister, Baron Von Neveu, who interested himself in the success of our undertaking with the warmest zeal, and in a truly literary spirit, we soon received a royal safe conduct (*portaria*), which allowed us to travel through, and to examine at our pleasure the province of Rio de Janeiro, and most strongly recommended us to the assistance of the authorities, in every case where we should stand in need of it.*

If any person, considering that this is a new continent, discovered only three centuries ago, should fancy that Nature is here still entirely rude, mighty, and unconquered, he would believe, at least here in the capital of Brazil, that he was in some other part of the globe; so much has the influence of the civilisation of ancient and enlightened Europe effaced the character of an American wilderness in this point of the colony, and given it the stamp of higher cultivation. The language, manners, architecture, and the influx of the productions of the industry of all parts of the globe, give a European exterior to Rio de Janeiro. But the traveller is soon reminded that he is in a strange quarter of the world, by the varied crowd of negroes and mulattoes, who, as the labouring class, everywhere meet him, when he sets his foot on shore. To us this sight was less agreeable than it was striking. The degraded, brutish nature of these half-naked, unfortunate men, offends the feelings of the European, who has but just quitted the seat of polite manners and agreeable forms.

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* See Note 1. page 199.

Rio de Janeiro, or properly St. Sebastiano, commonly called only Rio, lies on the shore of the great bay, which extends from the city northwards into the continent three times as far as the distance to the anchorage. It occupies the north-east part of a tongue of land, of an irregularly quadrangular shape, situated on the west bank, which stretches towards the north, and towards the south is connected with the continent. The most easterly point of this tongue of land is the *Punta do Calabouço;* the most northerly, opposite to which is the little *Ilha das Cobras*, that of the *Armazem do Sal.* The oldest and most important part of the city is built between these two points, along the shore, in the direction of north-west to south-east, and in the form of an oblong quadrangle; the ground is, in general, level, only at the most northerly end are five hills, rather long, and so near to the sea as to leave room for only one street by the sea-side; towards the south and south-east the city is commanded by several hills, the promontories of the Corcovado, a woody mountain. The more ancient, north-east part of the city is traversed by eight straight, pretty narrow, and parallel streets, and divided into squares by many others crossing them at right angles. The Campo de S. Anna, a large square, to the west of the old city, separates it from the new town. The latter, which has, for the most part, arisen since the arrival of the court, is connected by the bridge of S. Diogo over the arm of the sea called Sacco d'Alferes, with the south-western quarter, or Bairro de Mato-porcos, and, by the extensive suburb of Catumbi, with the royal palace of S. Cristovao, situated to the north-west. Mato-porcos lies immediately against the lower eminences of the Corcovado, which rise south-west of the city, where this row of hills terminates at the sea. The church of Nossa Senhora da Gloria forms a distinguished object on its summit, commanding the southern part of the city. From this place, farther towards the south, detached rows of houses occupy the two semicircular bays of Catête, and Bota Fogo, and single houses lie scattered in the picturesque side-valleys, which branch out from the Corcovado, and among which the Valley of Laranjeiras is the most pleasant. The city, in its greatest extent, already measures above half a mile. The houses, which are low and narrow in proportion to their depth, are for the most built of blocks of granite, or in the upper story, of wood, and covered with tiles. Instead of the old latticed doors and windows, we already see everywhere complete doors, and glass windows. The gloomy projecting cabinets before the windows, closed, according to oriental custom, have made way by the king's command, for open balconies. The streets are, for the most part, paved with granite, and provided with raised pavement for the foot-passengers; but they are very sparingly lighted, and hardly more than a few hours in the night, by the lamps placed before the images of the Virgin Mary. From the regularity of the streets it is agreeable to the eye to meet with several open squares, such as those before the royal palace, before the theatre, the public promenade (*passeio publico*), or the Campo de S. Anna.

The hills along the north-eastern bank are partly covered with large buildings; the former college of the Jesuits, the convent of the Benedictines, on the most north-easterly hill, then the episcopal palace, and the Forte da Conceição, have a grand appearance, especially when seen from the sea. The residence formerly occupied by the viceroys, which, after the arrival of the court from Lisbon, was enlarged by the addition of the Carmelite convent, and fitted up for the royal family, stands in the plain, opposite to the above-mentioned molo. This building is by no means in the grand style of European palaces, and its exterior seems unworthy of the monarch of so promising and rising a kingdom. In general, the style of architecture in Rio is mean, and resembling that of the old part of Lisbon; yet it seems that architecture, the works of which so immediately relieve one of the greatest wants of human life, will improve more rapidly than the other arts. The presence of the court already begins to have a favourable effect on the style of building, as is proved among other edifices, by the new Mint, and several private houses in Catête and Mato-porcos; they continue also to blow up rocks of granite with gunpowder, partly to make the city more level and connected, and partly to adorn it with new buildings. Among the churches, which altogether have neither fine paintings, nor works of sculpture, but only rich gilding, those da Candelaria, de S. Francisco, de Paula, are distinguished by their good style of architecture, and that of Nossa Senhora da Gloria, by its elevated station; but the finest and most beautiful monument of architecture of which Rio can at present boast, is the Aqueduct, which was completed in 1740; it is an imitation of the noble work of the same kind erected by John V. at Lisbon, by the lofty arches of which, spring water is brought from the Corcovado to the fountains in the city. The largest of these fountains, in the square in front of the palace, and close to the harbour, supplies the ships, and is constantly surrounded by crowds of sailors of all nations. Captain Cook was mistaken when he expressed doubts of the goodness of this water for long voyages; for Portuguese captains have, by way of making the experiment, taken this water to India, and brought it back to Rio de Janeiro, when it was found to be still uncorrupted. New fountains continue to be erected in the city, and during our stay, measures were taken to provide the great square of S. Anna with a fountain, and to lead a new aqueduct to the south-west part of the city. In such a hot and populous city the attention of the government is justly directed to the obtaining of an ample supply of cool water fit for drinking, but the distribution of it by uncleanly negroes, who offer it for sale in open vessels or in skins (*borachios*), which are often exposed for hours together to the heat of the sun, requires to be altered by the Board of Health; indeed the government would do a great service to the inhabitants by causing the water to be conveyed into many private houses.

The bay of Rio de Janeiro, one of the finest and most spacious harbours in the world, and the key to the southern part of Brazil, has been long since carefully fortified by the Portuguese. The sudden capture of the city by the French, under Duguay Trouin (1710), who imposed on it a contribution of 246,500,464 rees, perhaps first made them sensible of the necessity of defensive works. The entrance is protected principally by the fort of Santa Cruz, which is built on the Pico, a steep mountain on a tongue of land on the east side, and by the batteries of S. Joâo, and S. Theodosio, lying opposite to it, to the north of the Sugar-loaf. The strait formed by the two points, which is only five thousand feet broad, is also commanded by the guns of a fort on the low rocky island Ilha da Lagem, situated almost in the middle of the entrance. In the interior of the bay the most important works are the fort de Villegagnon, and that of Ilha das Cobras, both on small islands not far from the city. State criminals are confined in the latter island; in the city itself are the Forte da Conceiçao in the north-west part of it, and the batteries of Monté, in the south-east; they are not, however, in the best condition. The inlet of Bota-Fogo is covered by the lines of Praya-vermelha.*

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* Here it was that Martin Alfonso de Souza, in his voyage of discovery, performed by the command of King John III., landed in January 1531, and gave the bay the name it now bears. The Praya-vermelha was formerly called for this reason, *Porto de Martin Affonso.* It is uncertain who it was that first visited this part of the coast of Brazil, but it appears that Joaô de Solis was the first who put in here in 1515. When Fernando de Magalhaens, with his fellow-countryman Ruy Falleiro, sailed along the whole east coast of South America, he anchored here in December 1519, and gave to the bay the name of Bahia de St. Lucia. Martin Alfonso soon left the place again, probably from fear of the numerous and warlike natives, the Tamoyos. The Portuguese were first made sensible of the importance of this place, when it was taken pos-

The internal basin of Rio de Janeiro has its tides as well as the ocean; at new and full moon, high water, which rises fourteen or fifteen feet, sets in at thirty minutes past four; the ebb sometimes continues a whole day without intermission, at which time the current is the strongest on the west side of the bay: on the other hand, when the flood begins, a whirling current is remarked on the east side. The flood continues a shorter time than the ebb, and usually runs at the rate of three or four sea miles in an hour; this strong flood has more than once led the captains of ships into error, and caused them to cast anchor too close to the shore, so that when the ebb set in they suffered shipwreck, there not being a sufficient depth of water for the vessels. An English ship which arrived from Liverpool after a remarkably favorable passage during our stay, and had cast anchor quite close to the Ilha das Cobras, was wrecked in this manner in the harbour, and the greatest exertions

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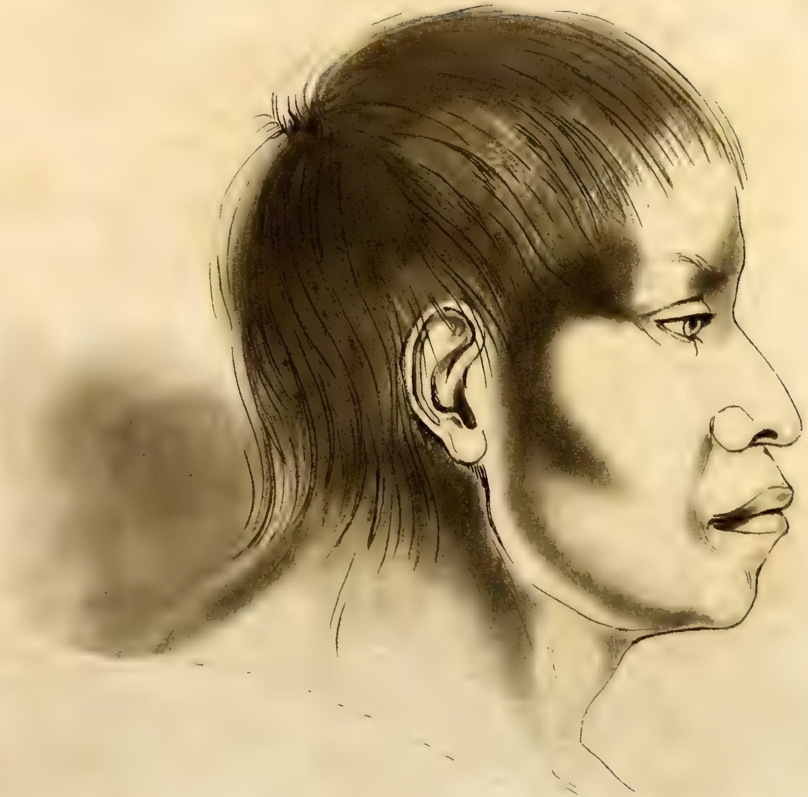
session of by Nicholas Durant de Villegagnon, who was sent hither by Admiral Coligny, and erected a fort. Mem de Sà, the governor-general of Brazil, having on the 15th of March, 1560, taken and destroyed the works erected by the French, the bay came into the hands of the Portuguese, who immediately began to build the town on its present site. The aborigines are said to have called the bay on account of its narrow entrance, *Nelhero-Hy*, or *Nithero-Hy*, that is, hidden water. (Patriota, for May 1813, p. 63.; Corografia Brasilica, ii. p. 1.) Lery calls it Ganabara.

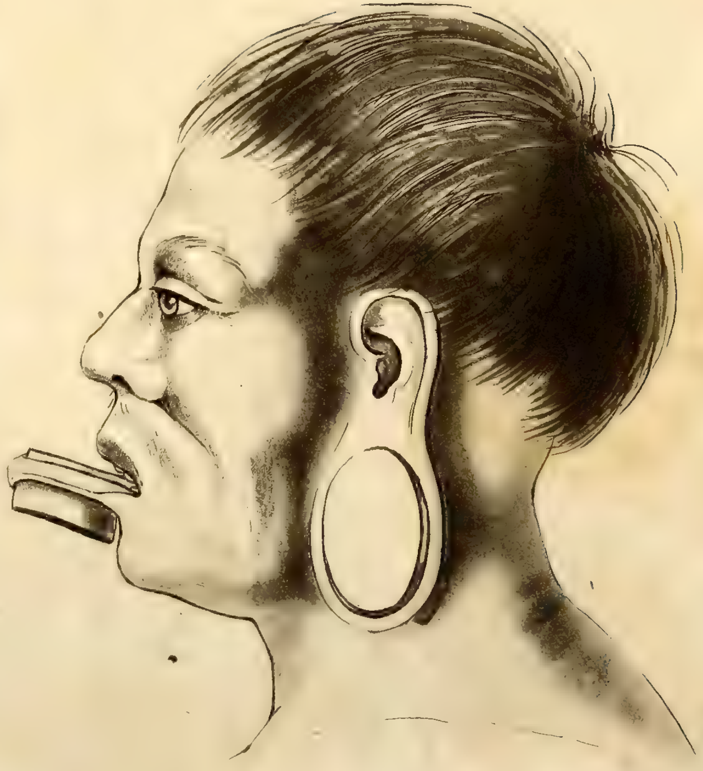
of the crew of our frigate, the Austria, who were called in to assist, could save only part of the goods, because the vessel was dashed to pieces on the rocks in a few hours. The sea, when it is high, particularly at the equinoxes, fills up the sandy hollows and lagoons, in several places round the city, which are planted with rhizophora, conocarpas, and avicennia trees; thus the sandy plain between the suburb of S. Anna, where we lived, the bay of Sacco d'Alferes, and the principal street towards S. Christopher, was sometimes changed into a lake, and limited our excursions through the valley. The saltness of this sea-water is rather less than that of the ocean on the outer coasts, and for this reason, and also because too many heterogeneous impurities are mixed with it, no salt is prepared in the vicinity of Rio; the greater part of that consumed here is imported from the rich salt lagoons of Setuval. It is preferable in this hot climate to the Spanish and Sardinian, because it has less tendency to deliquescence; a small part comes to the capital from the neighbourhood of Cabo Frio.

It will be readily imagined that with the extensive trade carried on here, the traveller every where meets the bustle of active industry. The harbour, the exchange, the market-places, and the streets nearest the sea, where the principal magazines of European merchandise are situated, are constantly filled with a throng of merchants, sailors, and negroes. The various languages of the mingled crowd, of all colours and costumes, crossing each other in every direction, among whom the negroes carry their burden on poles; the creaking of a clumsy two-wheeled cart, drawn by oxen, in which goods are conveyed through the city; the frequent salutes of the guns of the forts, and of vessels arriving from all parts of the world; lastly, the crackling of the rockets, with which the inhabitants celebrate religious festivals, almost daily, from an early hour in the morning, all combine to compose a confused unheard-of discord, which is perfectly stunning to the stranger.

By far the greater part of the population of Rio de Janeiro, consists of Portuguese and their descendants, both whites and people of colour. American aboriginal inhabitants are scarcely ever seen here. They avoid the city as much as possible, and appear but very rarely, and by chance, like birds of passage, in the bustle which is so contrary to their habits. The nearest are said to belong to the mission of S. Lourenço, on the bay of Rio de Janeiro, from which place they bring potters' ware for sale; others sometimes come from a greater distance, from the district of Campos, in the country of the Goytacazes, or from Arêas, a little villa, on the road to S. Paulo, or from Minas Geraës, in company with the caravans of mules, which maintain a constant communication between these places and the capital. The brown watermen, in the harbour, whom many travellers have



A COROADO.



A BOTOCUDO.

taken for Indians, are mulattoes of various tints. The first native American that we saw was a boy of the cannibal race of the Botocudos, in Minas Geraës; he was in the house of our friend, M. Von Langsdorff. The Conde da Barca, formerly minister of state, had, it seems, applied to the district commander of the Indians, in Minas Geraës, for an Indian scull, for our celebrated countryman, Professor Blumenbach; but the commandant not having an opportunity to obtain such a dead specimen, sent the count two living Botocudos, who had been taken in a sudden attack by his soldiers. M. Von Langsdorff obtained one of them, to whom he soon became much attached, and who served him not only as a living cabinet piece, but as a collector of objects of natural history.

Before the arrival of the king, the whole population of Rio consisted of fifty thousand souls, and the number of the blacks, and people of colour, considerably exceeded that of the white inhabitants. In the year 1817, on the other hand, the city and its dependencies contained above a hundred and ten thousand inhabitants. It may be considered as certain, that since the year 1808, four and twenty thousand Portuguese have gradually arrived here from Europe. This great afflux of Portuguese, to which must be added a considerable number of English, French, Dutch, Germans, and Italians, who, after the opening of the port, settled here, some as merchants, others as mechanics, could not fail, setting aside every other consideration, to effect a change in the character of the inhabitants, by wholly reversing the existing proportion of the white inhabitants to the blacks and people of colour. But it is particularly observable in the class of rich merchants in the capital, and even in the interior of the neighbouring provinces of Minas Geraës, and S. Paulo, what rapid strides civilisation and luxury, and consequently activity and industry, have made, in consequence of the vast accession of new inhabitants from Europe. Brazil has, properly speaking, no nobility; the clergy, the people in office, and the rich families in the interior, that is, land-owners and miners, possessed in a certain degree, before the arrival of the king, all the distinctions and privileges of nobility. The conferring of titles and offices by the king, drew a part of them to the capital, whence, having become acquainted with the European luxuries and mode of living, they began to exercise on the other classes of the people, an influence very different from that which they formerly had possessed. Even the more remote provinces of the infant kingdom, whose inhabitants, led by curiosity, interest, or private business, visited Rio de Janeiro, soon accustomed themselves to recognise that city as the capital, and to adopt the manners and modes of thinking, which, after the arrival of the court, struck them as European.

In general the influence of the court at Rio, upon Brazil, is in every respect incalculable. The presence of the supreme head of the state naturally inspired all the Brazilians, with a patriotic feeling which they had never before experienced, while in the situation of a colony they were governed by delegates, in the king's name. Brazil acquired in the eyes of every body, a new dignity: as it possessed the king, and carried on diplomatic negotiations on the other side of the ocean, it became, in a manner, included in the circle of the European powers. The king himself was made better acquainted with the advantages of the country, and the defects of the government. He profited by the former, and thereby secured the stability of all civil relations, and of property. Private credit increased; what was uncertain, partial, and dependent in the administration, made room for an independent order of things; and life and energy were infused into all public business. By this, and above all, by the opening of the port to the mercantile nations of all parts of the world, the cultivation of the soil, the welfare, the riches, the civilisation of the country, rapidly improved, together with the intercourse and increasing commerce with foreign countries. Yet it appears that, in general, the change from a dependent colony to an independent kingdom, was by no means considered, in Brazil itself, as a blessing, so much as the reaction of this event was felt as a misfortune by Portugal. Now, when experience has extended their views, and when the energies of this continent, called forth by political changes, more rapidly develop themselves, the Brazilians will be sensible how quickly they have been led through various degrees of improvement, during the twelve years, in which King John VI. has resided in this kingdom.

The king soon marked his presence in the new kingdom, by the erection of the same superior tribunals and authorities, as exist in Portugal. In the year 1808, he organised the *Dezembargo do Póço* (Ministerial Council of the interior and Council of State), *Conselho da Justiça* (Ministerial Council of Justice), *Conselho da Fazenda* (Ministerial Council of the Finances), *Junta do Commercio* (Supreme Tribunal of Commerce), *Meza da Consciencia* (Ministerial Council of Religious Worship), the *Relaçáo* (Court of Appeal) of Rio de Janeiro was raised to the rank of *Supplicaçáo* (Supreme Court of Appeal), a general intendancy of the police for the whole kingdom was established, and also an independent police for the capital, a royal treasury, a mint, and a record office. In the year 1805, the bishopric founded in 1676 was endowed anew, and provided with a numerous chapter; lastly, in the year 1810, a Royal Military Academy was founded. The boundaries of the captanias were more accurately determined, and the necessary tribunals erected. The organisation of these several departments, as well as a more precise regulation of the sphere of action of the Governors General of the Provinces, the regulation of the jurisdictions, and the more equal collection of the tithes and other imposts, have been great steps in the improvement of the new kingdom ; and history will recognise in the reign of John VI., a happy continuation of the beneficent influence of John III., that judicious and energetic monarch, from whose hands the colony first received form and life. The presence of the sovereign and of all the principal authorities of the state was essentially aided in its effects, on the establishment of a regular system in the new country by the great number of foreigners who, sooner or later, followed the court to Rio de Janeiro. English mechanics and ship-builders, Swedish ironworkers, German engineers, French artists, and manufacturers, were invited by the government, to animate the national industry, and diffuse useful knowledge. These efforts of the government, already, to transplant European activity and arts into the virgin soil, are the more worthy of respect, in proportion to the greatness of the difficulties which opposed them at the setting out. An important commencement towards the encouragement of industry was made with the arsenal ; for which a plan, on a small scale, was indeed already prepared before the arrival of the king, but was not formally organised and put into execution till 1811. In the long row of houses on the harbour, which are used for the manufacture of articles of the marine, we now see cables made of Russian hemp, utensils forged out of Swedish iron, and sails cut out of northern cloth. The most important articles which Brazil itself furnishes, are the excellent timber, tow, and pitch. This arsenal is, however, comparatively, more employed in working up foreign materials than the other arsenals of the country, and supplies them, while they on the other hand build many vessels. It is true that for the present, things manufactured here cost the government more than if they were procured by commerce, immediately from Europe; skilful workmen, who are for the most part Europeans, are retained only by high pay, and the blacks and mulattoes, who are yet but novices, are with difficulty accustomed to the active industry and perseverance of their masters; but these sacrifices of the government make it necessary to establish nurseries for these important professions. Thus this institution, like many others, serves as a proof of the prudent paternal care, which does not merely consider the present moment, but has in view the happiness of future generations. In this world which lies still rude and undeveloped before the regulating mind of the sovereign, the latter feels himself elevated above petty, interested opposition, and called by exalted duties to the creation of a better system for posterity.

On a more intimate acquaintance with the spirit of the Brazilian people, and with that of the society of Rio de Janeiro, the traveller, indeed, finds that these intentions of the government are, in general, not duly appreciated, and that the character of the Brazilian has been too powerfully influenced by a colonial administration of two hundred years' standing, for him already to apply with the same energy that distinguishes the European, to the serious occupations of industry, arts, and science, which consolidate the happiness, and the internal strength of a kingdom. Hitherto it is a taste for convenience, luxury, and the external charms of social life, which rapidly spreads here, rather than that for arts and sciences, in the proper sense of the term. While the progress of the latter has, in northern countries, been followed by the refinement of the enjoyments of life, the south, on the contrary, proceeds from the development of the pleasures of sense, and of external life, to the improvement of arts and science. Let us, therefore, not yet expect in the young capital those great influential establishments for the education and instruction of the people, which we are accustomed to see in Europe.

The library, said to contain seventy thousand volumes, which the king brought from Portugal, for the capital of Brazil, is arranged in the edifice belonging to the Terçeiros da Ordem do Carmo. The branches of history and jurisprudence are said to be the richest. We were particularly interested by a manuscript of a Flora Fluminensis, that is, of the Rio de Janeiro, which contains descriptions and beautiful drawings of many rare or unknown plants growing in the vicinity, and written by one Velloso. The public have free admission during the greater part of the day; but the want of literary occupation is so little felt here, that the library is not much frequented. To the same cause, and to the little inclination hitherto felt here to advance with the spirit of the sciences, it may be attributed that the only literary journal, *The Patriot*, which was published after the arrival of the court in Brazil, continued only a few years, though, by the variety of its contents it was calculated for extensive circulation. But a literary publication which deserves honourable mention is Father Casal's Corografia Brasilica, printed at Rio, in two volumes ; a work which, it is true, has many imperfections with respect to order precision, and correctness, especially in treating of subjects of natural history, but, as the first compendium of a general geography of Brazil, is of great use, and has been almost literally translated into English.* At present only two newspapers are published in the whole kingdom: in the capital, the Gazeta do Rio de Janeiro ; and, in Bahia, a paper under the title of Idade de Ouro do Brazil. But even these few journals are not read with general interest.† The inhabitant of the interior, in particular, enjoying the lavish bounties of nature, confined to the intercourse with a few distant neighbours, concerns himself very little with the events of the political world, and is satisfied with hearing the principal circumstances once a year, from the conductors of the caravans who return from the coast. In general, in the interior as well as in the sea-port towns, it is rather commercial relations than any regard to the interests of the world in general, that determine their participation in great political events. There is, however, no want of quick and accurate intelligence from Europe; the Lisbon newspapers being circulated by the Portuguese emigrants, and the London journals by the English.

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* Corografia Brasilica ou relação historico geografica do Reino do Brazil composta por luim Presbitero secular do Gram Priorado do Crato. Rio de Janeiro, 1817. 4to. Vol. 1, 2. A history of the Brazils ; comprising its geography, commerce, colonisation, aboriginal inhabitants, &c. by J. Henderson. London, 1821. 4to.

† The number of journals has been much increased since Brazil declared itself independent. *Trans.*

The education of youth is provided for, in the capital, by many licensed academies. Persons of fortune have their children prepared by private tutors, to visit the university of Coimbra; which, from the scarcity of good teachers, is very expensive. In the Seminario de S. Joaquim, the elements of latin and church-singing (*canto châo*) are taught: but the best academy is the Lyceum, or Seminario de S. Jozé, where, besides Latin, Greek, French, and English, rhetoric, geography, and mathematics, likewise philosophy and divinity are taught. Most of the teachers are ecclesiastics, who have, however, now much less influence on the education of the people than formerly; particularly during the times of the Jesuits. A very useful establishment of later years is the School of Surgery (*Aula de Ci-*

rurgia), which was founded in the former college of the Jesuits, on the same principles as the country surgical schools in the kingdom of Bavaria, to form practical surgeons, who are not to be found in the interior. After studying five years the young man may here be made master in surgery. The course of study is strictly prescribed*, and care is taken for the acquisition of positive knowledge, by attendance on the neighbouring military hospital. Most of the teachers in this establishment are, at the same time, practical physicians in the city, some of whom follow in their lectures the French elementary books, and some those of Cullen. Natural history, particularly botany, is taught the pupils by Fra Leandro do Sacramento, a learned Carmelite, from Pernambuco, and a disciple of the venerable Brotero. In his lectures he makes use of a small nursery of remarkable plants in the public promenade, because the botanic garden is too far from the city. The mineralogical cabinet, which is under the care of our countryman, Lieutenant-Colonel Von Eschwege, is not in a good condition, because he is generally absent from Rio de Janeiro. It consists of Baron Ohain's collection, described by Werner†, to which no very great additions have been made, except a beautiful suite of diamonds sent by Da Camara*, and some other mineralogical curiosities of Brazil. In the building which contains this collection, there is a most insignificant beginning of a zoological cabinet, consisting of a few stuffed birds, and some cases with handsome butterflies. The Military Academy (*Academia Militar Real*), founded in 1810, is intended for the scientific education of those who desire to dedicate themselves from their youth to the military profession; but though provided with good masters, and especially favoured by the king, its sphere of action is very limited, for it has hardly any scholars; but in the newly established Aula do Commercio, the lectures on commerce, and also those on chemistry, are numerously attended.

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* According to the plan laid down, they study in the first year Anatomy, Chemistry, Pharmacy; in the second, the same branches, with the addition of Physiology; in the third, Ætiology, Pathology, Therapeutics; in the fourth, Surgery, Midwifery; in the fifth they attend the Hospitals.

†Werner's description of a collection of Minerals &c. Luneberg, 1719. 8vo.

Immediately after the arrival of the king, it was intended to give a university to the new monarchy. It was, however, yet undecided whether the seat of it should be at Rio de Janeiro, or at S. Paulo, which is situated in a more temperate climate. Mr. J. Garcia Stockler, son of a German consul of the Hanse Towns at Lisbon, a man of considerable literary acquirements, and a worthy member of the Lisbon academy, proposed a plan, conceived partly in the spirit of the German high schools, which, indeed, was much approved by the ministry, but at the same time met with so much opposition from those who wished Brazil to continue dependent on Portugal, as a colony, that the whole plan was given up; and yet nothing but the establishment of a university can rouse the slumbering energies of the country, and thus Brazil, in laudable emulation with the mother country, be one day elevated to the rank of a great kingdom. Till this shall be done, the Brazilians will be compelled, however expensive and troublesome it may be to them, to complete their education beyond the ocean, at the Portuguese university of Coimbra. This necessity, however, was attended with various advantages to the young students; especially by giving them an opportunity of making themselves acquainted with the great institutions in Europe, to bring back to their own country the knowledge to be obtained in them, and in general to acquire the universality of European education. If, however, at some future time, a university should be founded in Brazil, it would be necessary in the present state of literature, to have the first professors from Europe.

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* Mr. Von Eschwege has described these diamonds in the second part of his Journal of Brazil, p. 49.

Another new institution, the Academy of Arts, is chiefly indebted for its existence to the late minister Araujo, Conde da Barca, who received almost the whole of his education in foreign countries. While Europe saw in the foundation of such an institution an apparently irrefragable proof of the rapid progress of the new state, it is evident upon closer examination, that it is at present by no means adapted to the wants of the people, and therefore cannot yet exert any extensive influence. Several French artists, historical and landscape painters, sculptors, engravers, and architects, and at their head Lebreton, formerly secretary to the Academy of Arts at Paris, (who however died, at his country-house, near Rio de Janeiro, soon after our arrival,) were invited from France in order by their instructions and works to awaken and to animate the disposition of the Brazilians for the arts, upon which Araujo had confidently calculated: but it could not fail soon to become evident that the fine arts cannot take root here, till the mechanical arts, which satisfy the first wants, have prepared a way for their reception; and that it is not till commerce, the activity of which is directed to external objects is finally established, that endeavours after the enjoyments and refinements of the arts, can arise in a nation. It is besides a necessary consequence of the present state of Brazil, that the inhabitant of this tropical clime everywhere surrounded by the poetical and picturesque natural beauties of his country, feels himself more disposed to the voluntarily offered enjoyments of so happy a climate, than those of art, which cannot be obtained without exertion. This circumstance points out the course which endeavours to introduce the arts and sciences into America in general take, and may serve as a hint to the sovereign, that the decoration of the political edifice by art, must be preceded by the consolidation of its foundations.

There is scarcely any taste here for painting and sculpture, and hence we see even in the churches, instead of real works of art, only ornaments overloaded with gold. Music, on the contrary, is cultivated with more partiality by the Brazilians, and particularly in Rio de Janeiro; and in this art they may perhaps the soonest attain a certain degree of perfection. The Brazilian, like the Portuguese, has a refined ear for agreeable modulation and regular melody, and is confirmed in it by the simple accompaniment of the voice with the guitar. The guitar (*viola*), here, as in the south of Europe, is the favourite instrument; a pianoforte, on the contrary, is a very rare article of furniture, met with only in the richest houses. The national songs, which are sung with the accompaniment of the guitar, are partly of Portuguese origin, and partly written in the country. By singing, and the sound of the instrument, the Brazilian is easily excited to dancing, and expresses his cheerfulness in polished society, by graceful cotillons, and in inferior company by expressive pantomimic motions, and attitudes like those of the negroes. The Italian opera is hitherto very imperfect, both as regards the singers and the orchestra. A private band of vocal and instrumental music, which the crown prince has formed for himself, of native mulattoes and negroes, speaks much in favour of the musical talent of the Brazilians. Don Pedro, who seems to have inherited from his ancestor Don John IV. a distinguished talent for music, sometimes leads this band himself, which, being thus encouraged, executes the pieces laid before it with great zeal. Haydn's favourite pupil, the Chevalier Neukomm was at that time composer to the royal chapel at Rio. The musical knowledge of the inhabitants was not yet ripe for his masses, which were written entirely in the style of the most celebrated German composers. The impulse which the genius of David Perez gave to the Portuguese church music (1752—1779) is past; and at present the first thing required of a mass is that it shall proceed in cheerful melodies, and that a long and pompous Gloria shall be succeeded by a short Credo. This is the style of Marcus Portugal, now the favourite composer among the Portuguese. The degree of perfection which music has attained among the higher classes at Rio, and the other sea-port towns of Brazil, entirely corresponds with the spirit in which poetry and the belles lettres are cultivated; for, in these, it is the French literature that is preferred by the superior classes in this country. The diffusion of the French language, and the importation of innumerable French books, are the more surprising, as there are only two indifferent booksellers' shops at Rio de Janeiro. Besides the publications of the day, with which the French *Magasins des Modes* supply Brazil, the works of Voltaire and Rousseau, in particular, are read with so much avidity, that several patriotic writers * have found reason to declaim against the Gallomania. This circumstance is the more remarkable, because political and mercantile interest unite the Portuguese with the English, and we might therefore naturally expect a greater inclination to the literature of England. † Even translations from the English into the Portuguese are by no means so numerous as those from the French. The language and poetry of the Germans are entirely unknown to the Brazilians; sometimes, but very rarely, we meet with an admirer of the muse of Gessner or Klopstock, with

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* Thus, for example, the energetic and learned Jozé Agostinho Macedo, author of the epic poem O Oriente, in his Journal Enciclopedico, one of the best periodical publications at Lisbon.

† It was from a conviction of the superiority of English literature, that a learned Portuguese nobleman, the Viscount de St. Lourenço, undertook, a few years ago, to translate into Portuguese Pope's Essay on Man, to which he has annexed a vast mass of notes, selected from English, French, German, Portuguese, Spanish, and other writers on the same or similar subjects. The extent of these notes may be judged of when we say that the work makes three quarto volumes. This must naturally render it less useful by limiting the number of the readers, on account of the expence, for besides its bulk, it is one of the most splendid specimens of typography of which the English press can boast, and adorned with fine plates, the first of which is an exquisite whole length portrait of Pope, from an original painting by his friend Jervas, in the possession of G. Watson Taylor, Esq. It was published in London in 1819. *Trans.*

which he has been made acquainted only by French translations. This general knowledge of the French has not, however, banished the mother tongue in the higher classes of society ; except the court, and those immediately belonging to it, the English and French languages are confined to the men, and are therefore seldom used in company. The fair sex, though they participate in the change which the removal of the court hither has occasioned, and are now more frequently seen in the theatre, and in the open air, have, however, on the whole, retained the same disposition which Barrow represents in his apologetic description in 1792.

The hospitable residence of Mr. Von Langsdorff was a very agreeable place of resort in the evening for many Europeans residing at Rio de Janeiro. A spirit of cheerful and animated conversation prevailed, which was enhanced by the musical talents of the lady of the house, and the co-operation of Neukomm. So great a number of naturalists, or friends of natural history, had never yet been assembled here, as just at the time of our stay. The mutual communication of the observations and feelings which the luxuriance and the peculiarity of the vegetation inspired, became doubly attractive, through the charms of the environs. Mr. Von Langsdorff inhabited a small country-house, on the declivity of the chain of hills which stretches from the city towards the south-west, and enjoyed from hence, amidst the fragrant shrubs of Brazil, an enchanting prospect over the city and part of the bay. Nothing can be compared to the beauty of this retreat, when the most sultry hours of the day are past, and gentle breezes, impregnated with balsamic perfumes from the neighbouring wooded mountains, cool the air. This enjoyment continues to increase as the night spreads over the land and the sea, which shines at a distance, and the city, where the noise of business has subsided, is gradually lighted. He who has not personally experienced the enchantment of tranquil moonlight nights in these happy latitudes, can never be inspired, even by the most faithful description, with those feelings which scenes of such wondrous beauty excite in the mind of the beholder. A delicate transparent mist hangs over the country, the moon shines brightly amidst heavy and singularly grouped clouds, the outlines of the objects which are illuminated by it are clear and well defined, while a magic twilight seems to remove from the eye those which are in shade. Scarce a breath of air is stirring, and the neighbouring mimosas, that have folded up their leaves to sleep, stand motionless beside the dark crowns of the manga, the jaca, and the etherial jambos * ; or sometimes a sudden wind arises, and the juiceless leaves of the acajú † rustle, the richly flowered

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* Mangifera indica, Artocarpus integrifolia, and Eugenia Iambos, L.

† Anacardium occidentale, L.

grumijama and pitanga * let drop a fragrant shower of snow-white blossoms; the crowns of the majestic palms wave slowly over the silent roof which they overshade, like a symbol of peace and tranquillity. Shrill cries of the cicada, the grasshopper, and tree frog, make an incessant hum, and produce, by their monotony, a pleasing melancholy. A stream gently murmuring descends from the mountains, and the macuc†, with its almost human voice, seems to call for help from a distance. Every quarter of an hour different balsamic odours fill the air, and other flowers alternately unfold their leaves to the night, and almost overpower the senses with their perfume; now it is the bowers of paullinias, or the neighbouring orange grove, then the thick tufts of the eupatoria, or the bunches of the flowers of the palms ‡ suddenly bursting, which disclose their blossoms, and thus maintain a constant succession of fragrance. While the silent vegetable world, illuminated by swarms of fireflies (*Elater phosphoreus noctilucus*), as by a thousand moving stars, charms the night by its delicious effluvia, brilliant lightnings play incessantly in the horizon, and elevate the mind in joyful admiration to the stars, which, glowing in solemn silence in the firmament above the continent and ocean, fill the soul with a presentiment of still sublimer wonders. In the enjoyment of the peaceful and magic influence of such nights, the newly arrived European remembers with tender longings his native home, till the luxuriant scenery of the tropics has become to him a second country.

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* Two pretty kinds of myrtle, Myrtus Brasiliensis, Lam. and M. pedunculata, L.

† Tinamus noctivagus, Perdix guyanensis.

‡ We noticed in several palms, that the bunch of flowers, when arrived at perfection, suddenly bursts its covering, and fills the surrounding air with perfume. This is most frequently observed in the Macaraiba palm (*Acrocomia sclerocarpa*, nob.).

These fine nights may be enjoyed at Rio de Janeiro without any fear of those disorders, which, in many tropical countries, for instance, in Guinea, are almost inevitable consequences of the effects of the evening dew, or of the land breeze that then sets in; yet even here it is advisable not to pass in the open air those moments when, after sunset, the atmosphere is suddenly cooled, and the first dew falls. In general, the earlier hours of the morning seem to be less injurious to the health than the evening, because with the return of the sun, the suppressed perspiration is restored. Rio de Janeiro, it is true, has the reputation, though it should seem without reason, of being one of the more unhealthy cities of Brazil. The climate is hot and moist, which chiefly depends on the situation, as high and thickly wooded mountains, the narrow entrance of the bay, and the numerous islands, impede the free passage of the winds: but there are none of those very rapid changes of temperature which are so injurious to the health. Moist cold winds, which produce slight rheumatisms are, however, not uncommon. Though the marshy flats on the sea-side diffuse, during the time of the ebb, an intolerable stench, fortunately for the inhabitants of the vicinity, they do not remain uncovered by the water long enough to produce endemic fevers by their putrid exhalations. The food of the lower classes is not of a nature to engender diseases. Mandiocca and maize flour, and black beans, which are usually boiled with bacon and salt beef dried in the sun, are the chief articles of their diet; which, though coarse, and not easy of digestion, is however wholesome, when combined with exercise and the drinking of Portuguese wine, and brandy distilled from the sugar-cane. Fish is not so much eaten as on the northern coasts. In hot countries, where provisions are liable to spoil more rapidly, the use of fish as food seems always to increase or decrease in the same proportion as the indolence, the poverty, and the sickly constitution of the people; thus we at least always found, during the whole of our travels, the greatest misery where the inhabitants were confined to fish for their food. The middle classes of the citizens of Rio, who have not entirely adopted the manners of Portugal, take, in proportion, little animal food, contenting themselves with the admirable fruits, and the cheese imported from Minas, which, with banians, is met with on every table. The Brazilian eats even wheaten bread but sparingly, preferring his farinha to it. The flour imported from North America, or from Europe, will keep five or six months. Even the numerous and delicate vegetables of Europe, all which might easily be raised here, constitute no important part of the food of the people. On the other hand, they are very fond of oranges, water-melons, and Spanish potatoes. Besides the simplicity of the Brazilian cookery, the health of the inhabitants of so hot a country is especially promoted by their praiseworthy temperance at their meals. The Brazilian eats but moderately of his few dishes, drinks chiefly water, and takes everything with the greatest regularity, following that strict order which is observable in all the phenomena of nature between the tropics. In the evening, he very prudently takes scarcely anything, at the most he drinks a cup of tea, or if he has not that, coffee, and avoids, especially at night, eating cool fruits. Only such a regimen, and conforming with the nature of the climate, preserves him from many diseases to which the stranger exposes himself, through inattention or ignorance. Above all things, therefore, the stranger should be advised to observe the same regimen as the Brazilians; neither to expose himself to the fatal effects of the sun's rays, by walking in the open air during the hottest parts of the day, when all the streets are deserted, nor to the dangerous consequences of taking cold in the night dews, and above all, not to indulge in sexual pleasures. Precaution is necessary also in drinking water to appease the almost insatiable thirst: we were advised to drink the water mixed with wine or brandy, but though we used this beverage with advantage, when we took little exercise, and kept in the shade, yet the violent tendency of the blood towards the head, during the journey, when we were very much exposed to the sun, particularly in the first year, soon obliged us to renounce all spirituous liquors; we therefore refreshed ourselves with the cool water of the stream without any addition, from which we never experienced any disagreeable effects, if we immediately again exposed ourselves to the heat. These remarks on regimen we cannot sufficiently recommend to the attention of travellers.

The diseases most frequent here, are chronical diarrhœas, dropsy, intermitting fevers, syphilis, and hydrocele; of all these, perhaps only the last can be considered as endemic and peculiar to the city. The physicians ascribe this disorder chiefly to the drinking of the water; but this, which is a fine spring water, rendered, it is true, warm and less agreeable by passing through so long a channel, or by the effect of the sun's heat while it is exposed to sale, can with the less reason be considered as the cause, as among the higher classes, where the disease is the most frequent, it is almost always improved by the addition of spirits. It rather should seem that imprudent and too thin clothing, getting violently over-heated and then taking cold, and excessive indulgence in carnal pleasures, tend not only to relax the muscles, an effect which the heat of the climate produces, independently of other causes, but likewise bring on a weakness of the nerves, and in consequence of that, the hydrocele. It is therefore chiefly remarked in the whites, the newly arrived Europeans and North Americans, in whom the abovementioned unfavourable influences produce, if not a total debility, yet a false direction of the action of the lymphatic system, and a weakness of the sexual organs. The physicians of this country prescribe as preservatives and remedies, local washings with rum and cold water, and the use of the truss. A disease which is very common in hot climates, called the *Sarna*, very frequently occurs here also. This malady consists in an inflammation of the glands, which ends in suppuration, with a local swelling resembling St. Anthony's fire; its symptoms are chiefly heat, tension, and intolerable itching. In persons of an irritable temperament, it not unfrequently produces sympathetic swellings of the inguinal and other glands. The chief causes are not, as is often erroneously supposed, uncleanliness and woollen clothing, but overheating, checking of the perspiration, irregularity in the gastric system, and obstruction of the secretory vessels, which are acted upon by the influence of the climate. The sting of myriads of tormenting mosquitoes, which is still more intolerable in gloomy damp days after great heat, contributes also to the development or increase of this disease. The cases are more rare in Rio de Janeiro, where the Sarna, after having long existed in a chronical state, changes to a generally diffused eruption, resembling the first stages of the leprosy, in which cases it is generally combined with syphilitic dyscrasy. The remedies employed against it are, internally, lemonade and slight doses of calomel, and externally, washing with very weak warm rum and water, bathing, and purgations. Chronical diarrhœas, passing into colliquation, dysentery and lientery, and also dropsy, are common at Rio de Janeiro. The diarrhœas, which are generally caused by taking cold, are often cured in the first stage by drinking warm vinegar lemonade. Diabetes is likewise observed here, but not so frequently as in cold countries; it is said to have been remarked that the negroes are far less subject to this disease than the whites and mulattoes, but the negroes suffer much more from the elephantiasis.

Rio de Janeiro has no endemic intermitting fevers; but the diseases readily assume a certain periodical character, or fever soon follows on the least disorder, in consequence of the activity of all the organic functions, and is rapidly succeeded by an entire dissolution of the juices. How much the augmentation of all external stimulants, particularly warmth and light, contributes in this climate to the acceleration of the animal functions, and to consequent exhaustion, we clearly found by our own experience, especially at the beginning of our residence, when the body was not yet weakened by fatigue and sickness. Even when in a state of the greatest repose, and without the influence of other stimulants, our pulse was quicker than in Europe: unfortunately this effect was changed into the opposite, when we began to grow sickly from the fatigues of our journey. This greater activity of the functions is manifested in health, as well as in sickness, by the quicker appearance of the symptoms and the more rapid progress of the disorder. It is nothing uncommon here, in Rio de Janeiro, and in the tropical countries in general, to see an individual who but a few days before was in full health, after suffering a short time from diarrhœa, cholic, fever, &c., at the point of death, and in the last stage of a putrid fever. Nothing but the speedy application of the most certain and powerful remedies can then save him; and in this respect, it may be said that the physicians here, more than in colder climates, must be not only *ministri* but *magistri naturæ*.

The croup manifests itself in this country with the same violence in its progress as in Europe. It has been particularly observed in white children. If it be true that this disease is of modern origin, and concurs to characterise the peculiar periods of the development of the human race, it is doubly remarkable that it is only a few years ago that it was first known, or at least first distinguished from other similar disorders in this new world, which is now frequented by many whites. Instances are mentioned in which a cure has been effected by a prompt application of dulcified mercury. Repeated experience in our own persons has convinced us, how suitable this medicine is to the climate of the tropics in general, and we therefore advise the traveller to make use of it on all occasions, where it is desired to produce a specific effect on the lymphatic system, the action of which is here checked by so many injurious influences; nay, on many occasions it serves as a very welcome prophylactic, as it checks slight disposition to disease. An excellent succedaneum for it, especially in diseases of the liver so frequent here, is sea-bathing, which acts equally on the nervous, muscular, and lymphatic systems. Rheumatism and catarrh are likewise of frequent occurrence here, where the changes of the temperature are greater than in the more northern provinces of Brazil.

The syphilis, which is so prevalent throughout the torrid zone, is not unusual at Rio de Janeiro. The ravages of this disease, which, as we afterwards convinced ourselves, is foreign to the original inhabitants of America, are not so dreadful and extensive here as they have been in colder climates, for instance, in the islands in the South Sea, but the disorder is much more generally diffused among the whole population. The climate, the temperament of the colonists, and above all, the introduction of the negro race as slaves, have co-operated, in a frightful manner, to make the disorder general, not only on the coast, but in the remotest parts of the interior provinces of the continent. If the intensity of the venom has been lessened by being transferred to a hotter climate, the facility with which it is communicated seems to have greatly increased; on the other hand, the susceptibility is here much greater than in colder countries, partly on account of the more rapid action of the system, and partly of the debility produced by excesses, and increased by the body's being frequently overheated. The small-pox, too, which for these ten years past has appeared hardly otherwise than sporadically, does not very injuriously affect the constitutions of the inhabitants of Rio de Janeiro, because the hot climate and the relaxation of the frame favour the development of the disease. It cannot however be overlooked, that people of the Caucasian race go through this disease much more easily than the negroes, and still more than the Americans. It almost seems as if the poison of the small-pox, during the long course of its ravages, had become more assimilated to the constitution of the Europeans, than to that of the other races of mankind, whose organism is not yet equally accustomed to this far-spreading and powerful contagion. The

Indians, who are very susceptible of imbibing the poison, bring the disease to maturity with the greatest difficulty, and frequently fall victims to it; which is attributed to the thickness and hardness of their skin. The physician, who compares many diseases in Brazil, such as the small-pox, syphilis, &c. with those in other parts of the world, is led hereby to remark, that as each individual is subject, at every stage of life, to particular climacterical diseases, so whole nations, and ages, more easily receive and develop certain diseases, according to the respective state of education and civilisation.

From this account it may be inferred, that at Rio de Janeiro there are indeed dangerous diseases, but none that can be properly called endemic. Perhaps even the hydrocele is only conditionally to be considered as such. It may be easily supposed that where so many strangers, from many different climates resort, the mortality must be greater in the city than in the country; but this is not a proof of any malignant character of disease. We endeavoured, but without success, to procure lists of the deaths and burials, which would have given us some information respecting the degree of mortality usual there. In general, much remains to be effected by the future efforts of the government, for the improvement of public regulations, and laws on this subject; as well as for the cleaning of the streets, which at present is left to the care of the carrion vultures, which are protected on that account; and for the superintendence of the police over the sale of medicines, the practice of physic, &c.; all of which will require the serious attention of superior authority. The two chief measures which have hitherto been adopted for the preservation of the public health, are the rigorous examination of the certificates of health of ships arriving from foreign countries, and the introduction of vaccination under the direction of a physician. With respect to the latter point, children and adults are vaccinated on certain days in the year, in a public building; but the due examination of the state of the patient as suited to the operation, and of the progress and consequences of the disorder, in the patient, is hitherto very imperfect, or wholly wanting. For all such matters, it is much more necessary in an infant, thinly peopled state, to employ the influence of the clergy, than it is in Europe; until vaccination therefore is strictly enforced by measures of police, in the same manner as baptism is by the authority of the church, the country will remain exposed to the sudden and almost resistless ravages of the small-pox, and consequent depopulation.

Rio de Janeiro possesses at present, now that the hospital dos Lazaros has been removed to a neighbouring island, two large establishments for the sick, the Hospital of Mercy (*Hospital da Misericordia*) and the Royal Military Hospital; both situated in the old city, and not far from the sea. The first was founded by the charitable subscriptions of the citizens, and is under the direction of a council of administration chosen from their body. This building, consisting of two stories, receives, in four principal wards, about two hundred patients, but is capable of accommodating a greater number. The patients are separated into classes, according to their several diseases, and the women are all together in one large ward, to which strangers have no access. Among the patients are a few lunatics; but their number is extremely small in this country, where the cultivation of the intellectual faculties has not yet made any considerable progress. An establishment for poor children is also united with this hospital.

The Royal Military Hospital occupies the buildings of the ancient Jesuits' college, situated on an eminence. It is calculated for the reception of some hundred male patients, and is conducted with more order, and more attention to cleanliness, than the city hospital. The roofing of the building, with light shingles, is peculiarly adapted to so hot a climate, a free draught of air being promoted by this arrangement, as much as by the use of ventilators. In both these hospitals, the greater part of the medicines are made up according to certain customary recipes expressly introduced for them. Besides these recipes, use is also made of the Pharmacopœia of Lisbon, and partly also of those of London and Edinburgh. The custom of noting the commencement and the course of the disease, the diagnosis, the medicines administered, and the diet, on the table before each bed, is not very strictly observed. Each of these establishments has its own chapel and laboratory. The English have also erected a marine hospital for their seamen, on a tongue of land on the east side of the bay opposite the city, where they have the magazines for their naval stores. This hospital is attended by an English physician, under the authority of the British consulate, and German sailors are likewise admitted into it.

Near the sea lies the public promenade; it is a small garden surrounded with walls, and protected against the sea by a perpendicular quay of hewn stone. Its shady avenues of mango, jaca, or the East India bread-fruit tree, the yto, and the rose apple tree *, between which the beautiful bushes of the poinciana † are planted, are unquestionably very inviting in the evening, when the heat is allayed by the sea-breezes. Formerly, there was in this garden a breed of cochineal insects on Indian fig-trees, which were planted for that purpose along the sea-shore; but at present, the cultivation of this article, which might be brought to be a very

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* Mangifera indica, Artocarpus integrifolia, Guarea trichilioides, and Eugenia Jambos, L.

† Cæsalpina pulcherrima, L.

valuable branch of commerce, is entirely neglected throughout Brazil. *

In the vicinity of this promenade, the provision-markets afford an interesting sight to the newly arrived European. The new fish-market, situated close to the sea-side, is particularly abundant in all kinds of fish, crabs, and sea tortoises of the most singular forms. On the opposite side of this market, his attention is attracted by the screams of the parrots exposed for sale, the cries of other animals peculiar to the country, and of birds brought from other parts of the world, adorned with the gayest plumage. In the green-market, besides the kinds of cabbage, cucumbers, lettuce, leeks, and onions common in Europe, there are also vegetables of Indian and African origin. For the pigeon pea †, and several kinds of water-melons, the ginger root, &c., Brazil is indebted to the intercourse of the Portuguese with the East Indies, as well as for the excellent fruits of the jaca, the mango, and the jambos. The various kinds of red, black, and speckled beans‡, on the contrary, and the almond-

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* See on this subject, Memoria sobre a Cochenilla do Brasil, por J. de Amorim Castro, in Memorias Economicas da R. Academia da Lisboa, vol. ii. p. 135.

† Cytisus Cajan, L. or Cajanus flavus, Dec. called in Brazil *Andu.*

‡ Phaseolus derasus (Schrank Hort. Mon. t. 89.), and Dolichos Sinensis (Curtis's Botanical Magazine, t. 2232.), which plant, with small red round beans, is cultivated also by the Caffres and Hottentots, are the two commonest species.

like mundubi bean (*Arachis hypogæa*), seem to have been chiefly imported from the African colonies. * Divers kinds of Spanish potatoes, and yam †, the mandiocca and Aypim roots ‡, a mild and not poisonous variety of the first, and lastly, maize, maize flour, and mandiocca flour, as being the principal articles of food from the vegetable kingdom, are always to be found here in very large quantities. Fresh grass (*caapim*), which is grown in gardens in the neighbourhood, is brought to market as fodder for the cattle, especially for horses and mules. The Guinea grass is considered as the best for fodder; many quite different species however are known by this name in the several provinces of Brazil. §

A few days after our arrival, we were invited by one of our countrymen to attend a religious festival which is celebrated by the negroes in honour of their patroness *Nossa Senhora do Rosario.* A chapel on a slip of land running into the bay, not far from the royal country-seat of S. Cristovâo, to which we repaired, was filled towards the evening with a countless multitude of brown and black people, and the band of negroes from S. Cristovâo struck up a lively and almost merry strain, which was succeeded by a very pathetic sermon.

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* See Note 2. page 200.

† Convolvulus Batatas, Dioscorea alata, L.

‡ Jatropha Manihot et var. L.

§ Panicum jumentorum, Pers. Paspalum stoloniferum, conjugatum, decumbens, virgatum, &c.

Sky-rockets, crackers, serpents, and the like, were let off in front of the church, and near the calm surface of the sea, to add to the splendour of the solemnity.

Two very different feelings are excited in the observer when he beholds the children of Africa placed amidst the more exalted relations of European civilisation; on the one hand he remarks with joy the traces of humanity which gradually develop in the negro by his intercourse with the whites, while on the other hand he cannot but grieve that means so cruel, so contrary to the rights of mankind as the slave trade, were required to afford to that unhappy race, degraded even in their own native country, the first school of moral education. These feelings affected us still more deeply when we were obliged to go to the slave-market to look for, and purchase, a young negro for ourselves. The greater part of the negro slaves who are now brought to Rio de Janeiro, come from Cabinda and Benguela. They are made prisoners in their own country by command of their chiefs, and bartered by them in exchange for European goods. Before they are delivered to the slave-merchant, the chief has them branded with a certain mark in the back or on the forehead. With no other covering than a piece of woollen stuff about the hips, they are then packed into ships, often in far too great numbers for the size of the vessel, and carried to their new destination. As soon as such slaves arrive at Rio de Janeiro, they are quartered in houses hired for the purpose in Vallongo-street, near the sea. There may be seen children from six years of age upwards, and adults of both sexes, of all ages. They lie about half-naked, exposed to the sun in the court-yard, or out of the houses; or are distributed in several rooms, the two sexes being kept separate. A mulatto or old negro who has acquired experience in long service, has the superintendence of the food and other necessaries for the new comers. The chief article of subsistence is mandiocca, or maize flour (*Fuba*), boiled in water (*mingau*); and, more rarely, salt meat from Rio Grande do Sul. The preparation of this simple food, which they eat out of hollow gourds, or dishes made of the calabash (*Crescentia Cujete*, L.), is left, as much as possible to themselves. Negroes and negresses who conduct themselves well, are rewarded with snuff or tobacco. They pass the night on straw mats with blankets to cover them. A great number of these slaves belong to the sovereign, and are brought as tribute from the African colonies. Whoever wants to buy slaves repairs to the Vallongo to make his choice, where every inspector draws up the slaves quite naked, for his examination. The purchaser endeavours to convince himself of the bodily strength and health of the negroes, partly by feeling their bodies, and partly by causing them to execute rapid motions, particularly striking out the arm with the fist doubled. What is most apprehended in these purchases, are hidden corporal defects, and especially the very frequent disposition to blindness. When the choice is made, the purchase money is fixed, which for a healthy male negro is here from 350 to 500 florins: the seller generally making himself answerable for any corporal defects that may be discovered within a fortnight. The purchaser then takes away his slave, whom he destines according as he wants him, to be a mechanic, a mule-driver, or a servant. The new proprietor is now absolute master of the labour of his slave and the produce of it. But if he is guilty of inhuman treatment of him, he is liable, as for other civil offences, to be punished by the police or the tribunals. The latter take care, by means expressly adopted for the purpose, to restore runaway slaves to their right owners, and punish the fugitives if they renew the attempt, by putting an iron ring round their necks. If the master will not punish his slaves himself, it is done after payment of a certain sum, by the police in the Calabonço. Here however, as well as in Brazil in general, the negroes easily become habituated to the country. This is a consequence of their careless tempers, as well as of the similarity of the climate to that of their native country, and the mildness with which they are treated in Brazil.

Before the removal of the court from Lisbon to Rio de Janeiro, the trade of this and all the other cities of Brazil was strictly confined to Portugal. The daily increasing production of valuable colonial articles, and the diligent working of the gold-mines in the interior of the country, had greatly augmented, during the last hundred years, the riches and consequently the wants of the Brazilians; the trade of Lisbon and Oporto therefore indemnified the mother country for the loss of the East Indies, from which it derived the first sources of its power and greatness. The intimate political and mercantile union of those two cities with the colony, was extremely favourable to the former, and the more so, because its happy situation near to the Mediterranean and the coasts of the ocean, on the route of universal commerce between Europe and the East and West Indies, made it more easy to dispose of colonial produce. The Portuguese merchants at that time, not only fixed at pleasure the prices of all the productions of Brazil, which was obliged to sell exclusively to them, but could likewise make their payments in European merchandise, and upon conditions prescribed by themselves. Thus Lisbon, at the close of the last century, had attained a degree of activity and wealth, which made it next to London, the first commercial city in the world. But after a royal decree* had founded the independence of the Brazilian commerce, this state of things very speedily changed. The freedom of the Brazilian commerce, which the monopoly and jealousy of the mother country had hitherto checked, and the opening of the ports to all nations is the commencement of a new era in the history of Brazil. It may be asserted, that of all the measures which the government has adopted since its removal to the colony, none has occasioned such a remarkable impulse and so great a change as this. But it has undoubtedly been more advantageous to Brazil than to Portugal. The latter, after the dissolution of the intimate union between it and its former colony, will never regain its preceding commercial splendour.

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* The Carta Regia, by which free trade in the Brazilian ports was laid open to foreigners, is of the 18th of February, 1808.

This emancipation gave occasion to manifold improvements in Brazil; the competition of the other commercial nations with the Portuguese, led to new relations. The freedom of trade gave an impulse to industry, and the produce of the country, being in demand from various quarters, grew more valuable. This again increased the want of labourers, the influx of strangers, and the importation of the negroes necessary for the cultivation of the land. Tempted by the views of an advantageous commerce, colonists from other countries arrived, and contributed to the instruction of the inhabitants, to a more accurate knowledge of the country, and to the increase of its riches. A very great alteration was hereby effected in the public revenue, especially since many duties of forty-eight per cent. have been reduced to twenty-four, and fifteen. The mercantile system previously subsisting between Portugal and Brazil, was particularly shaken by the treaty concluded with England*, which gave to the English flag equal, nay even greater privileges in the ports of Portugal and its possessions, than the Portuguese. An additional convention extended the freedom of the British commerce. † English merchants obtained in the Juiz Conservador a distinct tribunal for their commercial connections with the Portuguese subjects. It was likewise intended, on occasion of the marriage of Her Imperial Highness the Archduchess Leopoldina, to establish a commercial intercourse with Austria, in which the two states were reciprocally to favour each other; this plan was, however, never brought to maturity. Perhaps too, it might be difficult for the Austrian articles, some few excepted, to equal in cheapness the English, with which they would have to contend, and the more so as all articles, except the Portuguese and English, pay a duty of twenty-five per cent.

The importation of European productions and manufactures into Rio de Janeiro, extends to all imaginable human wants. Portugal and the islands send wine, oil, flour, biscuit, salt, butter, vinegar, stockfish, hams, sausages, olives, and preserved or dried fruits, distilled liquors, leather, medicines, coarse calicoes, hats, coarse woollens, iron ware, Bohemian glass wares, German and Dutch linens, paper (chiefly Italian), Portuguese books, musical instruments, gunpowder, pottery from Oporto, ammunition, cordage, canvass, sail-cloth, tar, pitch and other articles for the marine, steel, shoes, copper wares, &c., &c., &c. In former times, East India goods were brought here in large quantities from Lisbon, but at present they are imported direct from India. England (particularly London and Liverpool) and its colonies supply Rio de Janeiro with all articles of English manufacture, especially cotton goods of all kinds, fine cloths, porcelain and earthenware, iron, lead, copper, tin, raw and wrought, anchors, cables, gunpowder, porter, cheese, salt butter, distilled liquors, &c. From Gibraltar they receive many East India goods, and, in Portuguese ships, also Spanish wines. France imports, particularly from Havre de Grace and Brest, in these latter times, articles of luxury, trinkets, furniture, wax candle, drugs, liqueurs, pictures and prints, French books, silks, looking-glasses, hats, fine glass goods and china, dried fruits, oil, and butter. Holland sends to Rio de Janeiro beer, glass goods, linen, Geneva, which is very much used in all the tropical countries on account of its diuretic qualities, paper, &c. Austria has sent many things to Rio de Janeiro on speculation, namely, watches, pianofortes, muskets, linen, silk and half silk stuffs, velveteen, flannel, mortars, iron hoops, fishing hooks, penknives, currycombs, quicksilver, sublimate, cinnabar, vitriol, sal ammoniac, brass, lead, copper, tin, antimony, iron wire, arsenic, white and yellow wax, minium, nails, isinglass, orpiment. The other parts of Germany, which formerly carried on a very extensive trade in Bohemian glass and linen, with Spain and Portugal, have now tried the experiment of sending consignments of these goods direct to Brazil, but have especially carried on a very good trade in Nuremberg toys, and in iron and brass utensils, which are made in the shapes usual in that country. Russia and Sweden import iron, steel, copper utensils, sail-cloth, cords, ropes, and tar. North America sends to Rio de Janeiro chiefly corn, soap, spermaceti candles, biscuit, train oil, tar, leather, boards, pitch, potashes, and rude furniture. The trade with the coast of Africa furnishes but few articles, which are all but secondary to the slave trade. The number of slaves is very considerable; in the year 1817, 20,075 negroes are said to have been imported into Rio under the Portuguese flag, from the ports of Guinea and Mozambique. The articles imported from Mozambique, besides slaves, are gold dust, ivory, pepper, Colombo root, ebony, coculus indicus, sometimes also East India goods. From Angola and Benguela, they receive wax, palm oil extracted from the fruit of the Dente palm (*Elæis guineen-*

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* In February 1810, at Rio de Janeiro, by Lord Strangford, on the part of England.

† See Note 3. page 200.

sis, L.), Mundubi oil from the seeds of the *Arachis hypogæa*, L., ivory, sulphur, and some gum Arabic. These two latter articles, and salt, are the chief imports from the Cape de Verd Isles. The immediate trade of Rio with the East Indies, has become considerable since the arrival of the king, as several of the first mercantile houses at Lisbon settled here, and endeavoured to give more activity to their intercourse with India and China, to which they were so much nearer, which, on the other hand, caused a great deduction from the trade of Lisbon. These ships commonly touch at several English ports in India, and also at Macao, and perform their voyage in eight, ten or twelve months. Goa, and the other Portuguese possessions in the East, the importance of which has been greatly diminished by the influence of their powerful neighbours, are seldom visited on these occasions. The chief imports from those possessions are many kinds of cotton goods, which are re-exported to Portugal, and to different ports of South America. The imports from Macao are fine muslins and printed cottons, silk stuffs, porcelain, tea, Indian ink, cinnamon, pepper, and some camphor. Rio is the general staple for all the numerous small ports on the Brazilian coast, northwards to Bahia, and southwards to Monte Video, which send thither their produce for exportation to Europe, or home consumption. The quantity of provisions in particular, annually imported from all these places is considerable; they consist of farinha, beans, bacon, and dried or salt meat. The produce of their cattle, such as hides, ox horns, horn tips, dried and salt meat, tallow, and bacon, and rice and wheat flour, come by sea chiefly from the provinces of Rio Grande do Sul *, and S. Paulo. The latter furnishes also cheese, tanners' bark of the mangrove tree, some gum, cotton, sugar, and rum. The capitania of S. Catherine sends sole-leather, onions and garlic which thrive there admirably, dried fish, and pottery. The small harbours to the north of Rio, such as S. Joâo do Parahyba, S. Salvador, Macahé, Porto Seguro, Caravellas, Victoria, &c., supply the market of Rio with a considerable quantity of vegetables for the table, fish, and the productions of their fine forests, such as beams, planks, pipe-staves, hoops, charcoal, fuel, Brazil wood, tanners' bark, cocoa-

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* The total exportation of wheat from Rio Grande de San Pedro amounted, in the year 1816, to 279,621 alqueires (70lb.); in the year 1817, to 133,359; in 1818, to 76,395. The exportation of hides from the same place was, in the year 1816, 368,909; in 1817, 238,979; in 1818, 290,950. For these, and other statements, we are indebted to the kindness of our friend, Mr. F. Schimmelbusch of Solingen, who, during many years' residence in Brazil, has acquired very extensive knowledge of its commercial relations. From Chili, which, according to Bland, exports much corn, none has yet come to Rio de Janeiro. In fact, the intercourse between these two places is still very inconsiderable. During the time of our stay, a Swiss made the first speculation, by a consignment composed chiefly of German manufactures, to Valparaiso.

nuts, also tobacco, sugar, rum, and rice. Cabo Frio sends tubs and casks made of the trunks of large fig-trees (*gamelleiras*), and, as well as the neighbouring island Ilha Grande, also lime of calcined shells or rocks. Ilha Grande, having excellent materials, furnishes extremely good pottery. The trade with Pernambuco and Bahia is not inconsiderable. From Bahia, Rio receives tobacco, slaves, millstones, tucum (thread made of the fibres of the palm), cocoa-nuts, articles from Guinea and Europe; from Pernambuco, salt, saltpetre, and also European articles. Buenos Ayres and Monte Video supply the market of Rio de Janeiro with hides, leather, ox horns, tallow, dried salt meat, and wheat flour. This coasting trade is principally carried on in small one or two masted ships, and keeps up a constant intercourse between the whole Brazilian coast and the capital. From the mouth of the La Plata to Rio, the voyage is generally completed in twenty-two to thirty days, from S. Catherine and Rio Grande do Sul in fifteen to six and twenty days, from Porto Seguro in eight to fifteen, from Bahia in twelve to twenty, according as the wind blows along the coast from south or north, which depends on the position of the sun. Maranhâo and Para export their productions direct without farther intercourse with Rio de Janeiro.

The trade by land, too, is very extensive between Rio and the neighbouring provinces, especially with S. Paulo and Minas, to which there are tolerable roads. From Rio Grande do Sul and S. Paulo many thousand oxen, horses, and mules are annually driven hither, and many of them are forwarded to the neighbouring capitanias. Minas sends its cotton, coffee, and tobacco chiefly to Rio de Janeiro; the road to which, though from some parts further than to Bahia, is more pleasant and less difficult. In the year 1820, the importation of these articles was — cotton 70,407 arrobas, coffee 20,000, and tobacco 54,281 arrobas. Besides these raw productions, and precious stones, Minas exports cheese, marmalade, brown sugar-loaves (*rapadura*), an enormous quantity of very coarse cottons which are used for clothing the slaves and poor shepherds in the southern provinces. The inhabitants of the remoter provinces of Goyaz and Matogrosso, who come to the capital to provide themselves with European manufactures, and convey them home by the roads through Villa Rica and Caétete, bring hardly any thing but gold in bars or dust, precious stones, and among them even diamonds, which are contraband. It is nothing uncommon to see inhabitants of the deserts (Sertoès) of Cujabá and Matogrosso, who have made a journey of three hundred miles or more by land, to lead back caravans of mules laden with articles for the consumption of the interior. The Brazilian is not to be deterred by the dangers and fatigues of a journey which often separates him eight or ten months from his family, from undertaking from time to time the management of his commercial affairs in person; for the more retired his native place is, the earlier he has accustomed himself to disregard long journeys from it. A man who undertakes almost weekly a journey of five or six miles* on horseback to attend mass at church, or to visit his neighbours, does not fear to travel several hundred miles, if it is necessary, to exchange the harvest of one or several years for the valuable productions of foreign countries.

The exportation of the articles of commerce, produced in the country itself, to the ports of Europe, was the first foundation of the prosperity of Rio de Janeiro. The forwarding of goods imported from Europe, to the smaller ports, and into the interior, is indeed likewise a fertile source from which the capital annually derives large sums; but it bears no proportion to the mass of colonial produce which Rio sends beyond sea. The three most important articles of agriculture are sugar, coffee, and cotton. The first is particularly cultivated in those districts of the capitania, which lie to the south and east of the mountain chain (Serra do Mar), and nearer to the sea (Beiramar), that is, in the districts of Ilha Grande, Cabo Frio and Goytacazes. The two districts of Paraiba-Nova, and Canta-Gallo, lying beyond the mountain chain, are not so favourable to the cultivation of this article, which marks, as it were, the limits of the warmest and moistest parts of the country, where it grows luxuriantly. Most of the sugar plantations and manufactories (*engenhos*) are situated in the vicinity of the capital itself, and about Cabo Frio. It is well known that the cultivation of the sugar-cane was introduced into Rio de Janeiro, by the governor Mem de Sá, immediately after the expulsion of the French, in the year 1568, The sugar exported from the harbour of Rio de Janeiro, in 1817, amounted to 17,000 chests, or about 680,000 arrobas. It is only within these few years that coffee has been extensively cultivated in the capitania of Rio, and it has been observed that it will be equal in quality to that of Martinique and Saint Domingo, as soon as the necessary care is taken in gathering it. The coffee of Rio was formerly not liked in Europe, as they generally plucked the unripe berries, and in order to separate the seed from the external husk, they were suffered to corrupt, which injured the taste, and gave the berry a white colour and unsound appearance. Within these few years the cultivation of the coffee tree, and the gathering of the crop have been improved; particularly since Dr. Lesesne, an experienced planter from Saint Domingo, who was driven from that country during the troubles, formed a great plantation in the neighbourhood of Rio, and instructed the cultivators in the most advantageous manner of treating that plant. This example, and the increased demand, have caused the cultivation to be considerably extended; and at present Rio de Janeiro furnishes, among all the ports of Brazil, the greatest quantity of coffee, and that which is most in request. During the last years the exportation amounted, in the year 1817 to 9,567,960 pounds, in 1818 to 11,140,350, in 1819 to 8,087,220 pounds (on account of the drought), in 1820 to 14,733,540 pounds. The cotton exported from this place to Europe, particularly to London and Liverpool, is not merely the production of the neighbourhood; a very large part of it is brought to Rio on mules from Minas, chiefly from Minas Novas. From six to eight arrobas, put into two sacks made of raw hides, are the usual burthen of each mule. The cotton tree cultivated at Rio (*Gossypium barbadense*, L. sometimes, but more rarely the *G. herbaceum*, L.) thrives very well, but is said not to furnish such durable materials as that in the higher and drier district of Minas Novas. Tobacco is principally grown in the islands in the Bay of Rio, in that of Angra dos Reys, and on the lowest coast land (Beiramar), for instance in the vicinity of Paraty; it is also brought here from the capitania of Espirito Santo. The dried and salted hides which Rio de Janeiro sends principally to England and France, are mostly brought from Rio Grande do Sul, S. Paul and Minas. A view of these most important articles of exportation during the year 1817 is subjoined.*

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* It is stated in a subsequent note, that Portuguese or Brazilian miles, 18 to a degree, are meant: one of these may therefore be taken as equal to four English miles. *Trans.*

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* See Note 4. page 205.

Besides these staple articles, Rio de Janeiro exports to Europe, tallow, otters' skins, but in very small quantities, horse hair and hides, ox horns, horn tips, and plates, rum, treacle, whale oil, whalebone, ipecacuanha, rice, some cocoa and indigo, the demand for which has continued to decline, fustic-wood of a very good quality, and logwood. Pernambuco wood grows indeed in the forests of the province, but the government to which it belongs, has not had any felled for many years, and there are now no magazines of it in the place. It may be assumed that the total value of these articles amounts yearly to 1,600,000 milrees or 2,000,000 piasters, and pays to the treasury 446,400 milrees, or 558,000 piasters export duty. The rule according to which the productions of the country generally pay duty, is at the rate of two per cent. on the market price, besides some charges in the same proportion as we mention below on coffee, sugar. &c. To the smaller ports of Brazil, Rio exports all kinds of European goods; to Pernambuco and Ceara, sometimes considerable quantities of vegetables, when a drought causes them to fail there. Of late years slaves have been exported from Rio to the northern provinces in great numbers. The west and east coast of Africa receive English and Portuguese goods from this place. Lastly, gold bars and Spanish dollars must also be considered as an export article from Rio de Janeiro. Both Portuguese and North American Indiamen often take from here, instead of goods, large sums in silver, which they carry to India. It is affirmed* that in some years the value of the silver exported in this manner has amounted to 500,000*l.* nay even 800,000*l.* sterling.

The great difference in the value of the imports and exports in favour of Rio de Janeiro, which from the excess of the latter draws large sums in ready money from Europe, indicates at once the nature of the commercial relations between Europe and this rich though infant state. The precious metals which the rapacious eagerness of preceding centuries has snatched from the bosom of America, are now gradually returning to their native country, and either remain there or find their way to India. The admirable situation of the secure and spacious harbour, on the shores of an ocean where navigation is in general safe and practicable at all seasons, almost, as it were, at the entrance of the principal route of universal commerce; the short time in which voyages may be performed from here to Europe, the west coast of Africa, the Cape, Mozambique, India, and New Holland; the abundance of inland produce and of precious metals; and the great impulse which the presence of the court gives to the country, have already so much extended the connections of this place, that it must become at no very distant period one of the richest ports in the world. The activity of trade in the capital of Brazil, proves that the variety of productions must at present be greater than it could be, if those accounts were true which represent Brazil as a country yet wholly uncultivated, without any traces of the beneficial influence of European industry. It is true, the colonial produce exported from the port of Rio de Janeiro is indeed not entirely grown in the province, but is partly brought from the remote districts of the interior. But a comparison of the exportation of some articles from this port, with the same from England, gives us a very favourable idea of the productiveness of this country. England is said to have shipped in the year 1817, 401,700 cwt. coffee, and used about 600,000 cwt. for home consumption. If the latter account be correct, Rio de Janeiro alone would have exported nearly double the quantity of coffee consumed in England.

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* John Luccock's Notes on Rio de Janeiro, Lond. 1820, 4to. p. 595.

Even before the arrival of the king it had become necessary to establish a bank, on account of the great capital in circulation, to represent which the gold and silver coin was not half sufficient, even if all the rich men of the province had contributed all their ready money. Several of the first merchants and capitalists had united, who contributed a fund in proportion to the notes issued by them under their joint guarantee. Under the management of a committee, chosen by the founders, the establishment, which was only a private undertaking, prospered, and extended among the mercantile public in general the credit which it at first only enjoyed among its authors. It is probable that the amount of the bank-notes was increased, without any addition to the fund. In the sequel, when the institution continued to thrive, they united with the bank an insurance company, farming of the regalia of the crown, &c.; and it enjoyed in uninterrupted activity, without foreign interference, such great confidence, that many public officers placed a part of their salary in the bank, and rich land-owners in the interior of the country sent their capitals to Rio, to deposit them in the bank for their children, as the safest part of their property. When the king came to Brazil, the change of the political relations led to a new epoch for the bank. On the 12th of October, 1808, its statutes were sanctioned by the king, and the institution, under the title of Bank of Brazil, extended the sphere of its activity. The bank provided for the frequent and considerable wants both of the court and the state, sometimes on the security of valuable effects deposited in it, and sometimes on that of mortgages of the future revenue. It is reported that several foreign merchants endeavoured about this time to shake the solidity of the bank, by suddenly presenting bank-notes to a large amount; however, payment being immediately made, to which the intimate union between the royal mint and the bank, might perhaps contribute, it still maintained itself in very good credit, particularly in the mother country itself, though without any known solid guarantee, and without any close connection with any similar establishments. The late events in the year 1821, when the king, before his departure, took considerable sums out of the bank, for which he deposited a part of the crown diamonds, which in the sequel were taken back to Europe, and, as it is affirmed, extensive embezzlements, appear greatly to have shaken the foundations of the establishment.

The amount of the current coin at Rio cannot be precisely determined; the less so, because immense sums are sometimes exported, the withdrawing of which from circulation, is often long and generally felt. The ships bound to India and China, as we have already observed, take, for the most part, ready money, either Spanish piasters, or Portuguese gold, which suddenly causes so great a scarcity of money, that not only the value of gold rises extremely in exchange, but the interest on bills runs up to twenty or twenty-two per cent. In such conjunctures, several months frequently pass before the want of currency ceases to be felt. The operations of the mint too, which purchases Spanish dollars, and recoining them as pieces of three pataccas, issues them again 160 rees higher, appears sometimes to produce a temporary scarcity in Rio. The rate of interest usual among the merchants for open accounts, but not for bill transactions, is twelve per cent. This is in proportion to the price of daily labour, which for a hired negro is 160 to 240 rees, and for a European labourer from one to two Spanish dollars.

Neither the state of trade as we have described it, nor the custom-house duties, are disadvantageous to industry in Brazil; for though a great quantity of merchandise and manufactures is imported which might be produced in the country itself, it is rather the want of artisans and mechanics, than the competition of foreign commerce, that causes articles made in the country to be so dear. As the population increases, the activity of the interior provinces will be animated, and consequently the balance of exportation and importation will become still more favourable to Brazil. Many mechanics, chiefly French, are at present settled at Rio, who have been encouraged by the government. Among the natives the mulattoes are those who show the most ingenuity and perseverance in the mechanical arts, and they are even said to manifest great taste for painting. The free negroes, of whom there is a great number in the city, do not prove such useful members of society as in the country, where they not unfrequently become able and wealthy farmers. The artisans, on the other hand, partly work with their own black slaves, who, under the strict discipline of their masters, learn, together with ability and aptness for business, also the virtue of social order. Trades and professions in general are not subject to the strict superintendence of the magistrate that is exercised in Europe. Many trades are carried on without being incorporated into guilds, and are exercised without restraint by any person who is so disposed, and yet the prices of all manufactured articles are very high. The liberty enjoyed by the owner of a slave to employ him in any mechanical profession that he thinks proper, is opposed to the constraint of European corporations. However, all trades which have any influence on the public health and welfare, are placed under the superintendence of the police. Bread and meat are sold by a legal assize, but the difference in the stock and the supply causes a great diversity in the prices. The European stranger is astonished at the number of gold and silver smiths and jewellers, who, like the other tradesmen, live together in one street, which calls to mind the magnificent Ruas de Ouro and de Prata of Lisbon. The workmanship of these artisans is indeed inferior to the European, but is not destitute of taste and solidity. Many trades, which are very necessary in Europe, are at present almost superfluous in the interior of this country, on account of the circumscribed wants of the inhabitants. In the capital, however, and the other towns on the coast, joiners, white-smiths, and other artisans, are numerous; but tanners, soap-boilers, and workers in steel, are scarce. There is a great demand for mechanics, to build sugar and other mills, to construct machines for working the gold mines, &c., and very high wages are given them. Hitherto no glass, china, cloth, or hat manufactories have been established in the capital; and the erection of them would hardly be advisable, in a country which can obtain the productions of European industry on such low terms, in exchange for the produce of its rich soil.

NOTES TO CHAPTER I.

NOTE 1.

THE Portaria, which was extended in the sequel to the other capitanias, through which we travelled, was conceived in the following terms: Manda El Rey Nosso Senhor a todas as Authoridades Militares ou Civis a quem esta fôr apresentada, e o seu conhecimento pertencer, que se nao ponha embaraço algum à livre jornada de Mrs. Spix e Martius, Membros d'Academia Real das Sciencias de Munich, aos quaes Sua Magestade tem concedido a permissâo necessaria para viajar e demorar-se o tempo que lhes fôr conveniente em qualquer parte dentro dos limites desta Capitania do Rio de Janeiro; E determina sua Magestade, que se lhes preste nesta sua degreçâo toda a assistencia e auxilio de que precizar, logo que o pedir. Palacio do Rio de Janeiro em 12 Septembro de 1817.

(L. S.) JOAO PAULO BEZERRA.

The king our sovereign commands all military and civil authorities, to whom these presents may be shown, or to whose knowledge they shall come, that they shall not place any obstacle in the way of Messrs. Spix and Martius, members of the Royal Academy of Sciences at Munich, to whom His Majesty has granted the necessary license to travel within the boundaries of the province of Rio de Janeiro, and to reside wherever and as long as they think fit; His Majesty further commands, that all support and assistance of which they may be in need be afforded them, as soon as they require it. Given at the palace the 12th of September 1817.

(L. S.) JOHN PAUL BEZERRA.

NOTE 2.

Arachis hypogœa, L. Besides the importance of this plant to the cultivator in hot countries on account of its oily seeds, it is particularly interesting to the naturalist, because it hides its flowers in the earth as soon as they run to seed. There are several other instances in the family of leguminous plants of similar appearances, by which the seed is in a manner changed into a bulb; for example, in the *Vicia amphicarpus*, *Lathyrus amphicarpus*, *Trifolium subterraneum*, *Glycine subterranea*, *monoica*, and *hetorocarpa*, Hegetsweiler (Diss. *Tab.* 1812.). In the two last species, the size and structure of the seeds above and under ground are very different. Something similar is observed also in the *Milium amphicarpum*, Pursh.

NOTE 3.

Portuguese and English Commissioners, who met at London on the 18th of December 1812, regulated many other points which were not defined with sufficient accuracy in the first act. English manufactures pay 15 per cent. *ad valorem* on their importation into the Portuguese custom-houses. However, in many articles, the Portuguese officers are to take, not the current value, but the price fixed in the tariff (*Pauta*), as the standard for determining the duty; so that in consequence of the decline in the prices in proportion to the increased supply, the import duty on some articles amounts to 25 per cent. of the value. The Portuguese themselves paid, before the Royal decree of the 2d of May 1818, at the rate of 16 per cent. The

British trade derives peculiar advantages from the stipulation then made, and which subsists in the same manner between England and Naples, that English goods, the value of which, as stated by the importer, appears to be too small, cannot be taken by the Portuguese custom-houses, unless they return the duty which has been paid, and give the owner the stated value of his goods with an addition of 10 per cent.

In order to give our readers a more accurate knowledge of the principles followed by the Portuguese government in the late regulation of the customs, we will briefly state the chief points of the last decree on the subject, issued on the 2d of May 1818, which was carried into execution during our stay. In the custom-houses of the United Kingdom of Portugal, Brazil, and Algarve, and in all the other Portuguese possessions, the existing import and export duties shall be paid upon all articles without exception, even if they belong to the royal family, and all exemptions and privileges of the kind are declared to be suspended for twenty years. Foreign wines may be imported, but they pay three times as much duty as the Portuguese: foreign brandy pays twice and a half as much. Every new negro (*negro novo*) above three years of age, who is imported into the harbours of Brazil from Africa, pays, besides the already existing duty, amounting to near 6000 rees, an additional 9600 rees, half of which is to be deposited in the bank of Rio de Janeiro, to form shares, which are intended for the foundation of colonies of white settlers. Every arroba of dried salt meat exported from the harbours of Brazil in foreign ships, is to pay 600 rees, if in Portuguese, 200 rees. Gold and silver trinkets, polished diamonds, and other precious stones, pay an export duty of 2 per cent.

All Brazilian articles of commerce, which hitherto paid no fixed duty, pay henceforward an export duty of 2 per cent., as an equivalent for what were called the consulate duties, which, before the trade was free, they had to pay in the custom-houses of Portugal; but may then be re-exported from Portugal duty free. Brazilian articles of commerce which already pay fixed duties, are hereafter to pay them without the consulate duties. (These fixed duties are differently regulated, according to the tariffs of the several ports.) Portuguese manufactures, which enjoy no particular exemptions as national manufactures, are entitled, on importation into Brazil, to a deduction of 5 per cent. by way of bounty. Asiatic productions, which hitherto paid 8 per cent. on exportation from Portugal, pay henceforth only 3 per cent. The duty on all Portuguese goods is reduced from 16 to 15 per cent. Foreign goods in Portuguese vessels receive a deduction of 5 per cent. from the duty which is generally 24 per cent. Salt, whether imported by Portuguese or foreigners, pays 800 rees per moio (20 Brazilian alqueires). Foreign vessels pay in all the custom-houses of the united kingdoms, the same tonnage, anchorage, and light-house duties, which Portuguese ships pay in the harbours of the respective nations. (In Rio the anchorage duty is one piaster per day.) Slaves and goods of every kind imported into Brazil must, if they are to be re-exported to foreign countries, first pay the duty on consumption.

The same royal decree (*alvará*) commands the erection of light-houses, and the formation of what are called capatacias, in the sea-ports. The latter consist of societies of porters, mostly free negroes and mulattoes, who are divided into companies, under the direction and authority of the custom-house officers, convey the goods to and from the magazines, and are responsible for them as long as they remain in their hands. In the larger commercial towns of Brazil these corporations are on the same footing as at Lisbon, where they are very numerous, and carry burthens instead of mules. Their organisation resembles that of the Hamburgh porters called Litzelbrüder.

To the produce of the custom-houses in Brazil, which constitute an important part of the revenue, must be added the duties upon goods which are exported from one province to another. These *direitos da entrada* are very considerable, because they are imposed upon all goods without exception, according to the weight, on lead, iron, and other metals, as well as on the lightest stuffs, silk goods, &c. On entering the province of Minas Geraës, the arroba pays 720 rees; salt is the only exception, the duty being but 450 rees upon the arroba.* For every negro slave imported into Minas, 7800 rees are paid at the frontier custom-house (*registo*); on the river Paraibuna, for each head of horned cattle, mule, or horse, 2 pataccas (640 rees); for every person 1 patacca; for the countersigning of the passport 2 pataccas. Similar duties are paid at every frontier custom-house of a capitania.

But the wants of the state are farther provided for by imposts and taxes which are collected either immediately by the government, or by farmers (*contractadores*). These taxes are partly different in the several provinces, each of which has its own financial administration; in general, however, with some local modifications, the following are levied:—*Dizimo;* a tenth of all the produce of agriculture, fisheries, and cattle.—*Subsidio real* or *nacional;* duties on fresh meat, on raw and tanned hides, on sugar-cane brandy, and coarse woollens, which are manufactured in the country. — *Subsidio literario* (duty for paying the salaries of schoolmasters); on every ox that is slaughtered, on sugar-cane brandy, in some provinces, as in Maranhâo, also on the sale of salt meat from the interior (there it is 320 rees on six arrobas). — *Imposto paro o Banco do Brazil* (tax for the bank); an impost of 12,800 rees on every merchant, bookseller, and apothecary, every magazine of gold, silver, tin, pewter, and copper articles, tobacco, &c.; only the stalls of the barbers and shoemakers, whose trades are in some respects considered as the meanest, are exempted from it. A *sumptuary tax* on every four or two wheeled carriage (in Maranhâo it is 12,000 and 10,000 rees) is also destined for the bank. Another tax is levied on sugar-mills and distilleries; it varies in the different provinces. (In Maranhâo they pay 3200 rees for every sugar-mill (*engenho de moër canna*), in Bahia 4000 rees for every alembic.)—*Decima;* 10 per cent. on the annual revenue of houses and other real property in the cities. This tax is, however, paid only on the coast and in the more populous places of the interior; the inhabitants of the Sertâo do not pay it. — *Siza;* a tax of 10 per cent on the sale of houses and other real property in the city. — *Meia siza;* a tax of 5 per cent. on the sale of a slave who has already learnt his business (*negro ladino*). — *Novos Direitos* are a tax of 10 per cent. which persons holding places in the departments of the finance and justice pay out of their annual salary.—The *Sellos* (stamp duties), the *foros* (fees for patents), and the *Rendimentos da Chancellaria* (chancery fees), and the revenue of the *Correio* (the post-office), are not inconsiderable. Besides these imposts, others are levied by the magistrates in particular places, which go to the local treasury; for instance, a duty of 320 rees for each head of cattle which is exported out of the comarca of Paracatú, and another in the Villa Cayteté of 80 rees for every cargo of cotton which is exported.

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* Till within these few years, the importation of salt from Portugal and its colonies into Brazil, was let out to a farmer-general for the sum of 48,000 milrees per annum; the inhabitants of the coasts of Pernambuco, Cabo Frio, and Rio Grande were, however, allowed to make salt in their pits for their own consumption, but not to export it. (S. Ensaio economico sobre o commercio de Portugal por D. I. I. da Cunha de Azeredo Coutinho ediç. seg. Lisb. 1816, p. 20.) The monopolies and inland duties are said to have been abolished by the Crown Prince Don Pedro, since the departure of the king from the Brazils.

NOTE 4. — View of the principal articles exported from Rio de Janeiro in the year 1817.

ARTICLE.	QUANTITY.	CURRENT PRICE.	TOTAL VALUE OF THE ARTICLE.	EXPORT DUTY.	AMOUNT OF THE DUTY.
Sugar.	680,000 arrobas* (in 17,000 chests).	Mean price between fine white and Muscovade, 200 rees per arroba.	1,360,000,000 rees.	160 rees on every chest, and 2 per cent. on the current value.	29,920,000 rees.
Coffee.	298,999 arrobas.	2400 rees per arroba.	687,597,600 rees.	80 rees per arroba, and 2 per cent. on the current value.	37,671,872 rees.
Cotton.	320,000 arrobas (in 40,000 bales).	8000 rees per arroba.	2,560,000,000 rees.	100 rees per bale, and 2 per cent. on the current value.	55,200,000 rees.
Ox hides.	512,000.	1200 rees per hide.	614,000,000 rees.	20 rees per hide, and 2 per cent. on the current value.	22,528,000 rees.
Tobacco.	About 30,000 cwt. in 18,000 rolls and packages.	About 6000 rees per cwt.	180,000,000 rees.	20 rees per roll, and 2 per cent. on the current value.	3,960,000 rees.
Sum total.			5,401,597,600 rees.		149,279,872 rees.

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* An arroba contains 32 Portuguese pounds = $30\frac{1}{3}$ Hamburgh, or $31\frac{3}{4}$ Berlin pounds. Four arrobas make a quintal = $129\frac{1}{2}$ English pounds. Corn and salt are measured by the alqueire, one of which contains in Portugal 681 Paris cubic inches. A Brazilian alqueire is equal to $2\frac{1}{4}$ Portuguese, or about $\frac{6}{7}$ of an English bushel. A moio of salt contains about 20 alqueires. Liquids are measured by *pipas* and *canadas*. A Brazilian canada is = $5\frac{1}{7}$ Lisbon canadas = 2 English gallons. A pipa of port is reckoned at 60 Brazilian, or 312 Lisbon canadas. A pipa of molasses, rum, or fish oil, contains from 60 to 75 canadas. The measures of length are *varas*, of which 5 = 6 English yards = 8 Brabant ells; and *covados*, of which 27 = 20 yards English, or $26\frac{2}{3}$ Brabant ells.

The current coin of Brazil is different in the die and name from that in Portugal. It is calculated in rees, and the value of every piece is marked on it. There are copper coins of 10 and 20 rees; of silver of 80 and 160 rees; the single, double, and triple patacca of 320, 640, and 960 rees. The new gold coins are all of 4000 rees; there are older ones of 1000, 2000, and 3000 rees.

CHAPTER II.

EXCURSIONS IN THE ENVIRONS OF RIO DE JANEIRO.

We withstood the temptations of the beautiful natural scenery, which displayed itself before our windows, in all the splendour of the south, only till we had provided for the most urgent wants of our domestic arrangements. It was particularly the neighbouring mountains, clothed with thick verdure, that attracted us, and thither we accordingly undertook our first excursion. The way led still within the suburbs over that marshy level, which at new and full moon is covered by the high tide of the bay, and receives, besides the mud from the sea, all the filth of the city, such as dead animals, &c., and is therefore frequented by thousands of the carrion vulture, or urubus (*Vultur Aura*, L.). However disagreeable the look, and however unwholesome the exhalations from this plain may be, which, instead of high dykes and sluices, is provided only with shallow ditches to drain it, yet we stopped some time in it, our attention being engaged by many interesting objects. Wherever the sea-water had covered the ground, we found it pierced with innumerable holes, which serve as a retreat to the edible land-crab (*Cancer Uca*, L.). On the sandy bank we observed, not only several strand plants common to the tropical countries of both continents, such as *Avicennia tomentosa* and *Rhizophora mangle*, L., but also two others, natives of higher latitudes, namely, *Portulaca pilosa*, which is found on the coasts of Asia Minor, and *Pharnaceum Cerviana*, which is found on the Baltic. We traversed the principal street which leads through the quarter of *Mato-porcos* to the royal residences, S. Cristovâo and Santa Cruz; and passing a handsome country-seat, belonging to the bishop, we ascended the first hills of the Corcovado. Scarcely were we beyond the streets and the noise of the town, when we stopped, as if enchanted, in the midst of a strange and luxuriant vegetation. Our eyes were attracted, sometimes by gaily coloured birds or splendid butterflies, sometimes by the singular forms of the insects and the nests of wasps and termites hanging from the trees, sometimes by the beautiful plants scattered in the narrow valley, and on the gently sloping hills. Surrounded by lofty airy cassias, broad-leaved, white-stemmed cecropias, thick-crowned myrtles, large-flowered bignonias, climbing tufts of the mellifluous paullinias, far-spreading tendrils of the passion-flower, and of the richly flowering hatched coronilla, above which rise the waving summits of Macaubu palms, we fancied ourselves transported into the gardens of the Hesperides. Passing over several streams which were turned to good account, and hills covered with young coppice wood, we at length reached the terrace of the eminence along which the spring water for the city is conducted. A delightful prospect over the bay, the verdant islands floating in it, the harbour with its crowd of masts and various flags, and the city stretched out at the foot of the most pleasant hills, the houses and steeples dazzling in the sun, was spread before our eyes. We dwelt long on the magical view of a great European city, rising here amidst the profusion of tropical vegetation. We then pursued the road along the windings the aqueduct. The channel is chiefly built of blocks of granite, but the vaulted covering, within which the naturalist finds many of the most singular phalangia, is of brick. Between the woody hills there are diversified romantic prospects into the valleys below. Sometimes you traverse open spots where a stronger light is reflected from the flowery ground, or from the shining leaves of the neighbouring high trees, sometimes you enter a cool shady bower. Here a thick wreath of paulliniæ, securidacæ, mikanias, passion-flowers, adorned with an incredible number of flowers, climb through the crowns of the celtis, the flowery rhexias and melastomas, bauhinias, delicate mimosas, shining myrtles; there, bushy nightshades, sebastanias, eupatorias, crotons, ægiphilas, and innumerable other plants, form an impenetrable thicket, amidst which grow immense stems of the silk cotton tree (*bombax*), of silver-leaved cecropia, thorny Brazil wood tree, of the lecythis, with its singular fruit resembling a pitcher, slender stems of the cabbage-palm, and many other, in part still unnamed, sovereigns of the woods. The majestic sight, the repose and silence of these woods, interrupted only by the buzz of the gay humming-birds fluttering from flower to flower, and by the singular notes of unknown birds and insects, peculiarly affect the mind of the man of sensibility, who feels himself as it were regenerated in the prospect of the glorious country.

The stream, which the aqueduct conveys to the city, falls in one place in beautiful cascades over the granite rocks. Oblique-leaved begonias, slender costus, and heliconias, the red flower-stems of which shine with peculiar splendour, contrasted with the gloom of the forest, arborescent ferns and grasses, hanging bushes of vernonias, myrtles, and melastomas, bending under a load of blossoms, adorn the cool spots that surround them. Large and small winged butterflies play with the rippling water; and birds of the gayest plumage contend, morning and evening, to overcome the noise of the brook by their diverse notes. This fountain is called *Caryoca* *, and the natives of the province have from it the name of Caryocas, which they give themselves with pride, but with which the inhabitants of the other provinces combine a satirical accessory meaning. Ingenious poets of Rio de Janeiro, inspired by the beauties that surround this spring, have exerted themselves to celebrate by their songs the naiad who brings so beneficial a present to their native city. When exhausted by exertion and fatigue we often refreshed ourselves here with the cool water, and, over-shadowed by the trees swarming with life, in sight of the distant sea, examined our ample booty in birds, insects, and plants. We can never forget the feelings which were excited in us here; and only the man of a tranquil mind, who feels himself happy in the enjoyment of the beauties of nature, can appreciate the extent of the bliss, which we pilgrims from the north experienced amidst such magnificent profusion. Not far from the source, the valley declines from Laranjeiras towards the suburb of Catête. The wanderer is charmed by the gay variety in which gardens, new plantations, ancient forests, and scattered country-houses alternately engage the eye. In the middle of the slope and near the road we remarked a solitary hut among the bushes.

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* Caryoca, properly Caryb-oca, signifies, in the language of the native Brazilians, House of the Whites, House of Stone; and was probably the name given by the Indians to the dwell-

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ings of stone which the Portuguese built, as a protection against the fiery arrows of the natives. (Ensaio economico sobre o commercio de Portugal, por Azeredo Coutinho, edit. 2. Lisb. 1815, p. 6.)

It belongs to Count Hogendorp, who, having been much affected by the political changes in the state of Europe, passes his days here, far from the world and from politics, in intercourse with nature, and thinks it not below his dignity to provide for his subsistence by preparing charcoal from the trees on his estate. We had been previously introduced to him, and admired the firmness and strength of mind of a man, who, retired from the ever-changing tumult of worldly affairs, felt himself happy in a confined habitation, and in view of the ocean rolling from the shores of St. Helena.

At the cascade of Caryoca the road turns aside from the aqueduct, and leads over a dry eminence covered with low trees and shrubs, to the forest which clothes the ridge of the Corcovado. The narrow steep path passes over several streams. The vegetation is uncommonly strong and luxuriant; but the higher we ascend, the large trees gradually become more rare, and the bamboos and ferns more numerous, among which is a beautiful arborescent fern fifteen feet in height.* When you have made your way through the last thicket you reach the green summit of the mountain, where single shrubs, among which is a magnificent arborescent vellosia†, offer to the eye a vegetation resembling that of the higher campos of Minas. From this spot there is a beautiful view extending over the woods, hills, valleys, and the city, to the sea, the broad surface of which is lost in the distant horizon. Towards the south the mountain is broken, and the prospect loses itself in a steep declivity bounded by the blue bay of Bota-Fogo ; and still farther, the bold masses of the Sugar-loaf Mountain close the horizon. At this elevation, of about two thousand feet, the difference in the temperature is already so sensible, that you fancy yourself transported to a colder zone. Several streams flowing from the ridge of the mountain are always some degrees colder than the water in the aqueduct, and at the approach of sunset the summit of the mountain is enveloped in clouds which gradually sink into the valley.

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* Polypodium Corcovadense. (Raddi Synopsis silic. Bras. Bonon. 1819. 4to. p. 10. No. 76.)

† Vellosia candida Mik. (Delect. flor. et faun. Bras. t. 7.)

We ascended the top of this high mountain only once; but, on the other hand, were the more frequent in our visits to the aqueduct, the vicinity of which affords the richest collection of plants and animals. We were particularly desirous of following farther the stream of Caryoca, as in the torrid zone all animals prefer the vicinity of the springs. On one of these excursions we came to a solitary coffee plantation, which, as we afterwards learnt, belonged to the English consul, Mr. Chamberlain, who also amuses himself with entomology, and has a rich collection of the insects of the neighbourhood. Just as we arrived there, a beautiful crimson snake (*Colub. venustissimus*, Neuw.) with black and small white transverse bands, which is erroneously supposed to be venomous, had been dug up in the fields. In this moist tract we also found a seps (*Caryocanus*, nob.); the insects *Cychrus Amica*, nob.; *Prionus hieroglyphicus*, nob.; *Biglobulus rugosus*, nob.; *Buprestis quatuornotata*, nob.; *Imatidium cornutum*, nob.; and several singular slugs. From this rural retreat, which lies close on the declivity of the mountain, we had another magnificent prospect of the bay and of its beautiful verdant islands. The coffee trees were planted on the sides of the hills bounding a narrow valley, the summits of which were crowned by the Brazilian pine (*Araucaria imbricata*), with its dark grotesque branches extended like candelabras. In the surrounding forests, and, as we were assured, even in the neighbourhood of the plantation, there grows a kind of bark, which, since several years, has been exported under the name of *Quina do Rio* (*Coutarea speciosa*, A.?), the efficacy of which in intermitting fevers has been proved by experiments made by physicians in Portugal.* It is true, that many, especially quotidian fevers, pertinaciously resist the effects of this bark, which has much fewer antifebrile qualities than the Peruvian; it is, however, preferable to many other sorts which come to Spain from Peru mixed with the better kind. Perhaps this medicine would be more powerful if the bark of young trees were taken in preference, which has hitherto not been the case; the ignorant people employed to gather it having selected very thick and woody pieces, which can be pulled off without any trouble, to the finer bark of the young trees and branches. Another plant, containing a great quantity of bitter, is the *Carqueja* (*Baccharis genestelloides*, Lam.), which does not, indeed, grow here, but on the high mountains of Serra de Estrella. It is very often used by the Brazilians against intermitting fevers, and seems much to resemble, in its component parts, the *Eupatorium perfoliatum*[*], which is frequent in North America. It, however, differs from the pure bitters by the considerable admixture of resinous and aromatic parts.

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* Journal de Coimbra, No. 35. part i. p. 235, and No. 38, part i. p. 92.

Another equally interesting excursion that we used to make was to Tijuca, a place about a mile from the city, which was formerly much frequented by the inhabitants. The way is on the high road, past the royal country-seat of S. Cristovâo, which was built after his majesty's arrival, and by improvements in the grounds has been made a very agreeable retreat. The road lies between luxuriant hedges of cactus, lantana, bougainvillia, cordia, tournefortia and mimosa lebbek, above which the aloes shoot up their lofty flowering stems. The country is level up to the foot of the mountain; only an insulated verdant conical rock in the vicinity of the royal seat is a picturesque object rising above the variegated gardens and plantations. To the west of the road, a new aqueduct conveys the water of a stream from the mountains into the city. Citizens and peasants, on foot and on horseback, and frequently two persons mounted on one beast, give great animation to the road, on which the carriages of the rich people can only go as far as S. Cristovâo. It is pleasing to see in this paradise the traces of European industry, diligently culvated land, and beautiful country-houses. Ascending the verdant slope of the mountain, and between numerous country-seats, along a mountain stream which turned several mills, we at last reached the summit, where the fatigue of the journey was rewarded with a fine view towards the suburb of S. Cristovâo. The day was drawing to a close when we arrived, and, tired with our walk, we wished to find a lodging for the night. There was indeed a venda on the road, but it afforded only tobacco, rum, biscuit, and Minas cheese, and no accommodation; we were therefore obliged to seek refuge at the seat of a Frenchman of our acquaintance, which lay to the side of the road. The narrow path first conducted us upwards near a deep valley, and at last to the house in the middle of the wood, where we were obliged to content ourselves with some roasted potatoes and a wooden bench as a bed. The stars shone with uncommon radiance; a pale light lay over the gloomy forest; the silence of this retreat was interrupted only by the murmuring of distant streams; and lost in the contemplation of this attractive scene, we cheerfully resigned ourselves to the refreshment of sleep.

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[*] Bigelow, American Medical Botany, Boston, 1818, vol. i. p. 33.

Towards daybreak we proceeded towards the quarter from which we heard the sounds of the water, and just as the sun was rising, were at the declivity of a high rock, from which a crystal brook, partly dissolved into mist, fell from a height of nearly a hundred feet into the valley. The view of this sublime scene reminded us of the cascades of Naples and Tivoli, the ornaments of a similar, but far less rich and magnificent landscape. At the bottom of the valley and near the cascade stands a simple pleasant cottage, where we were welcomed by Mr. Tonay, an estimable French painter who resides with his family in this secluded spot. We parted with reluctance from this lovely place, and continued our journey south-south-west, towards the opposite declivity of the mountain. Passing over thickly wooded hills, we came to a deep valley, and at length to the foot of the Gavia, a picturesque granite rock, which rises close to the eastern banks of Lake Camorim, and by its sombre crags and woods hanging over the smooth mirror of the water, reminded us of the lonely lakes of Switzerland, and the principality of Saltzburg. The

Camorim, called also Jacarépaguá, a brackish mere, is connected to the south with the sea, into which it brings the tribute of many mountain streams, and by which it is swelled in high tides. In the low grounds near the lake, where the thickets of mangroves* do not entirely stifle all other vegetation, grow the most beautiful marsh plants, and large bushes of ferns. Among others, we found, on the cool soil of picturesque rocks, the beautiful blue flowers of the *Gloxinia speciosa,* which have been brought from this place to Europe by English gardeners. Only a few wretched huts belonging to fishermen, who are all of a mixed race, lie scattered in this solitude, from which the European art of horticulture could produce a creation, infinitely rich in variety and novelty of form. This lake produces such abundance of fish, that the inhabitants of this district do not even think of obtaining the necessary subsistence by cultivating the fertile forests that surround them: they scarcely plant sufficient maize, but a considerable quantity of Spanish potatoes, water-melons, and sugar-cane, the last of which they do not press, but merely suck out the juice. Considering this poor way of living, in a moist country where the air is not purified by a frequent change of wind, but is loaded with noxious exhalations, it is not surprising that the inhabitants are pale, weak and sickly.

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* The mangle or mangrove tree (*Rhizophora Mangle,* L.), which forms what are called manguesaës, is a low tree which grows on almost all the coasts of the ocean, particularly in America between the tropics, and is remarkable for the peculiarity that the seeds begin to shoot before they are detached from the tree, and the roots descend till they strike into the ground, and thus form a thick forest from one tree. On its stem, and under the roots is found the crab *Cancer Uca,* L. which is considered dangerous to eat, because it feeds on poisonous herbs.

As we endeavoured, on our return from this remarkable valley, to reach the plain of S. Cristovâo, we came to the other side of the mountain, to the coffee plantation of Dr. Lesesne, who has hired a large extent of land, and planted it with sixty thousand trees. According to the direction of this experienced planter, the fresh berries are planted, in preference, in the shade of other coffee trees, and the plants are taken up with the mould round them, as soon as they have attained the height of ten or twelve inches. It is said to have been observed that detaching the mould from the tender roots, checks the growth for a whole year; for trees treated in this manner, do not produce any fruit for the first thirty-two months, whereas others bear fruit in twenty months. The young trees are planted in the form of a quincunx. Many planters place the trees six feet distant from each other, but others only four, alleging as a reason that some of the trees in the ranks always die. The most luxuriant shoots in the middle of the trees are pruned away, and they are not suffered to grow more than twelve feet high, that the fruit may be more within reach, and the branches rather spread in breadth. When the trees are four or five years old, the produce is sufficiently considerable, and one negro is then appointed to take care of every thousand trees. While the trees are young and bear little or nothing, one negro is sufficient to keep two thousand trees in order, and to pull up the weeds. There are three gatherings, which occupy almost the whole year; at Rio de Janeiro, the first begins in the month of April. Only the entirely ripe red berries are taken, which easily part from the stalk, and the seeds are separated without difficulty from the shell. These berries are not thrown upon a heap and left to corrupt, as used generally to be done, but the whole fruit, when it is intended to proceed with particular care, is dried with the outside coat, and, besides, a kind of oil-mill is employed to take off the coat, and the naked seeds are exposed to the sun a whole month, that they may become perfectly dry. For this purpose they make floors, from about five and twenty to thirty feet square of bricks or of stamped clay, which are made convex for the rain to run off; the berries being protected against sudden showers, by portable straw roofs: about thirty arrobas may be spread on each floor. The number of negroes, each of whom can daily gather one arroba, determines therefore the number of floors required. The coffee when quite dry is kept in baskets, in a dry place, and exposed to the wind. The Brazilian planters, especially those at Rio, have the advantage over those in the Antilles, that the greater part of the berries become ripe in the dry season, which is the most favourable for gathering them.

We several times went by the road from the Bay of Bota-Fogo to the Lagoa de Roderigo Freitas, about a league distant, on which are the royal powder manufactory, and a nursery for foreign plants, called the Botanical Garden. This road, which runs sometimes on the slope of the granite mountain, between beautiful flowering bushes of myrtles, tournefortias, coronillas, and paullinias, on the branches of which, we for the first time saw the diamond beetle* alive, sometimes on the banks of the sea, covered with lofty ferns †, tropical grasses, and orchideæ, affords the most agreeable variety, and is much frequented, because many inhabitants of the city have country-houses in that neighbourhood. The sea-coast, it is true, furnished us with some addition to our collection of sea stars, sea hedgehogs, shells, insects, and marine plants ‡; but even here we were struck with the observation, which was everywhere confirmed in the sequel of the journey, that these species of animals and plants, so common on the coasts of the northern seas, are less numerous in the torrid zone, and are more rare in Brazil, than even in the East Indies. It almost seems, as if such obscure and imperfectly organised animals are assigned rather to the colder climates, and superior forms in greater numbers to the warmer. Perhaps too, the depth of the ocean on the coast of Brazil, which is much more considerable than in the Indian seas, may be a reason that the marine animals appear more rarely.

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* Curculio imperialis.

† Acrostichum aureum, abounds here.

‡ Ophiurus; Scutella sexforis Lam., quinqueforis Lam.; Echinus esculentus; Cicendela maritima nob.; Fucus Maximiliani Schrad., Opuntia L., Seaforthi Turn., sedoides Br.

The powder manufactory, and the dwelling-house of Senhor Joâo Gomez Abreu, colonel of the engineers, an amiable and well-informed Brazilian, from Minas-Geraës, who has the superintendence of this manufactory, and of the botanical garden, lie in a tranquil and retired spot, surrounded on the one side by wooded granite hills, and on the other by the Lake of Roderigo Freitas, which is about half a league in diameter. The abovementioned botanic garden lies behind the houses. Several fine avenues of bread-fruit trees, from the South Sea (*Artocarpus incisa*), the shadowy ytó (*Guarea trichilioides*), and mango trees, lead through the plantation, divided into regular squares, in which the most important object of cultivation is the Chinese tea plant. At present there are about six thousand trees planted in rows, about three feet distant from each other. The climate appears favourable to their growth; they bloom in the months of July to September, and their seed becomes perfectly ripe. This circumstance, with the similar attempts to cultivate other Asiatic plants, in America, is another proof that the prosperity of plants principally depends on the similarity of the latitude. The tea is planted, plucked, and dried precisely in the same manner as in China itself. The Portuguese government has directed its particular attention to the cultivation of this plant, the produce of which, to the value of twenty millions of dollars, is annually imported from China to England. The late minister, Conde de Linhares, invited several hundred Chinese colonists, in order by their means to make the proper manner of growing and preparing tea better known. These Chinese were said not to have been any of the inhabitants of the coast, who leave their country from poverty, and go to Java and the neighbouring islands there to look for work, like the Galicians in Spain and Portugal, but people from the interior had been chosen, who were perfectly acquainted with the management of the tea plant. Most of these Chinese, however, do not now live about the botanic garden, but in the vicinity of the royal residence of Santa Cruz, except a few who are employed here under the direction of Colonel Abreu, to tend the tea plants, and gather and prepare the leaves. The leaves are plucked three times a year, and laid on gently heated kilns of clay, on which they are dried and crisped. The director of the establishment gave us samples of the different kinds, which here also are chiefly distinguished according to the season of gathering. The taste was strong, yet by no means so delicately aromatic as the best kinds of Chinese tea, but rather earthy and rough. This disagreeable property must, however, be no discouragement in any new branch of cultivation, for it is a natural consequence of the plants not being perfectly accustomed to the climate. Besides the tea shrub, we were shown several other plants of India, such as the cinnamon tree (*Laurus cinnamomum*), the clove tree (*Caryophyllus aromaticus*), the pepper plant (*Piper nigrum*), the *Gnemon gneton*, the the nutmeg tree (*Myristica moschata*), the *Averrhoa carambola*, the sour fruit of which has a very pleasant taste in soup, &c. Though some of them were but a few years old, yet most of these trees had already borne fruit. All these plants will become naturalised here when they have been cultivated some years longer, for the new continent appears calculated by nature to receive the productions of all climates, and to bring them to the same perfection as their own country.

The powder manufactory near the botanical garden is the only one in Brazil, except a little private establishment in Minas, which has likewise obtained a royal license. The produce of these manufactories cannot, however, boast of being so well compounded as the gunpowder imported from Europe, which is nearly prohibited here. This is in all probability occasioned partly by something not suiting the climate in the saltpetre, which is brought to Rio from the Portuguese colonies in the East Indies, and from the saltpetre caverns on the Rio de Francisco, and partly by the nature of the charcoal which is here employed in the composition of the gunpowder. We are not certain what charcoal they use here, but during our journey into the interior, where the obtaining of powder from the coasts is very difficult, and on account of the heavy duty on foreign powder, very expensive, several of the inhabitants assured us that they made for their own use very good powder, by the wellknown mixture with the charcoal of several kinds of corindiuva (*Celtis*). The inhabitants, however, are prohibited from manufacturing this powder, which is far inferior in strength to the English. The country about the lake of Roderigo Freitas, like the neighbouring suburbs of Bota-Fogo and Catête, is considered to be remarkably healthy; and many of the rich inhabitants of Rio possess country-houses (*chacras*) on this side, in which they pass the fine season of the year. The road is therefore much frequented by passengers on horseback and in carriages. This part, where the inlets of the sea are less deep and more exposed to the wind, is freer from the torment of the musquittoes than the opposite side of the town; for instance, the quarter of S. Anna. Those troublesome and ravenous insects prefer the thick bushes of the mangrove, and the morasses which surround it, and are particularly annoying before sunrise and sunset.

Our friend, the consul-general, Mr. Von Langsdorff, had purchased a large estate on the road from the north side of the bay to Minas Geraës, a short time before we arrived at Rio de Janeiro, and just had commenced to plant mandiocca and to build a country-house for himself with the necessary appendages. We readily accepted his invitation to view, in his company, this new creation, of the riches of which in natural curiosities, he drew a delightful picture. On account of the great traffic between the capital and the harbour of Porto de Estrella, which is visited by all travellers going to Minas, boats set out daily between 11 and 12 o'clock, as soon as the sea-breeze springs up, and arrive at Porto de Estrella in the evening; on the other hand, boats regularly depart from the latter place after sunset, sail through the night, and reach the city by daybreak. We embarked one afternoon on board one of these broad-built boats, which are furnished with only one sail. The wind was faint, and impelled us slowly by the bare rocks, called the Enchados, which rise out of the sea not far from the coast, and are frequented by a number of sea-eagles and sea-gulls, (*Pelicanus aquilus, Cormoranus graculus, Procellaria brasiliensis,*) and then by several islands covered with thick wood, which lie scattered in the bay. On the largest of these islands, Ilha do Governador, situated almost in the middle of the bay, and extending two miles from E. to W., the king has reserved to himself the right of the chace; it is said to be inhabited by deer and wild boars, but he has never yet paid it a visit. In countries where the hunter is exposed not only to the attacks of the beasts of prey, but also to poisonous serpents and insects, and where the thickness of the forest seldom allows him to remain on horseback, to escape by that means the venomous animals whom it is not easy to see, the chase has but few attractions. A bear which the king received as a present from Russia, is shown here as a curiosity. It was upon an island exactly resembling these, but which lies before the mouth of the bay, and is called Ilha raza, that Sir Joseph Banks, when he touched at Rio de Janeiro in the company of Captain Cook, discovered the beautiful *Moræa Northiana*, which has since then become the ornament of European gardens. The indefatigable Commerson, too, when Bougainville put into the harbour of Rio, botanised on these islands and the adjacent continent; we therefore here trod upon a spot which had been rendered in a manner classical by the researches of those naturalists. The traveller loves to connect his own pleasures with those of his predecessors; we were accordingly very agreeably surprised when we found on those islands among the bushes, the moræa; and in the hedges out of the town the beautiful shrub *Bougainvillia brasiliensis*, with its dazzling red flowers, by which Commerson immortalised the name of his noble commander. Nature always maintains her creations unimpaired by the influence of time, and they survive all the monuments of human greatness. It was, therefore, a very happy idea in botany to perpetuate the names and merits of distinguished enquirers, by impressing them on flowers, whose races never become extinct.

When we landed on those low islands in the Bay of Rio de Janeiro, we were astonished at the vigour and luxuriance of their vegetation, which is occasioned by their low damp situation, and the great heat. The woods, in which there are, for the most part, the same species of trees as on the continent, but among them a proportionably far greater number of palms, especially the much-esteemed cabbage-palm *, are rendered almost impenetrable by thick underwood. The rapidity with which the vegetable world here passes through its various stages, till it at length decays and rots away, is as great as the impulse by which new creations continually arise on the remains of those that have fallen to decay. Upon and near the largest trunks, which, stretched out like enormous skeletons, suddenly return to the state of vegetable earth, we saw a multitude of many-coloured fungi † spring up, an

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* Euterpe edulis, nob. The young leaves (*palmito*) are frequently brought from these islands and the woods of the continent to the city markets.

† Boletus sanguineus, Sw.; Trichia expansa, nob.; Stemonitis fasciculata; Sphæria deusta, serpens, Pers., &c.

innumerable quantity of seeds shoot at the same time, and unfold themselves with incredible rapidity. The images of death and of the most vigorous life pass here in rapid succession before the eye of the wanderer. The few uncultivated spots of these fertile islands, which are clear of forests, are real marsh lands or savannahs. The grass grows extremely thick, and attains a surprising height and juiciness. Yet the inhabitants of this and the two larger islands, *Ilha grande* and *Marambaya*, which lie in the *Angra dos Reys*, and appear to be of the same nature, have hitherto paid but little attention to the breeding of cattle; and have rather employed themselves in cultivating maize, indigo, sugar, and tobacco. On the shore where the sea has here and there bared the granite rocks of their covering of good mould, these islands frequently produce thick groups of aloe and of prickly cactus, the stiff leafless stems of which make a singular contrast with the varied forms of the forest. The huts of the country people are, for the most part, situated along the coast, and surrounded with plantations of Spanish potatoes and water-melons, and with acajú, guava, pisang, oranges, jessamines, and roses.

When we left Rio de Janeiro in the afternoon, we hoped that we should be able to reach the opposite coast of the bay, though at a late hour, in the evening; but when we were nearly in the middle of the bay the wind suddenly subsided, and deprived us of the hope of passing the night on shore. We therefore adopted the advice of our friendly and cheerful host, to accommodate ourselves as comfortably as we could on the hard benches in the cabin. He, jokingly, wished us success in the result of a fatiguing campaign, which we were now going to undertake in the new country: the uninterrupted good humour of this experienced traveller afforded us, however, a favourable opportunity of learning what was the best antidote against the disagreeable adventures which we might still encounter. The night rapidly passed away in laying plans for our operations, during our intended stay at Mandiocca, and in the rapturous praises in which our friend broke out, when he spoke of the peaceful retirement of his country-seat, and of the luxuriance and beauty of the surrounding scenery. To the great sorrow of the lazy negroes we remained awake the whole night, and encouraged them to row, as this was the only means by which we could make any progress, and even then but slowly. The night was damp and gloomy; we were several times incommoded by numerous swarms of small musquittoes, which, however, soon successively passed over. The morning began to dawn, and we at length drew near to a very low swampy tract of land, covered with mangle, avicennia, conocarpus, and other small strand trees, between which the Inhumerim, an inconsiderable river, flows into the sea. We now left the bay, and the canoe was lifted up by the negroes by means of long poles. We were everywhere surrounded with thick bushes, and delighted with the wondrous diversity of the most beautiful groups in the hedges by the water-side, entwined with flowering gardenia, bignonia, seriania, and echites. A great part of the shores of the bay are covered with similar amphibious plants, which extend into the country only in those places where the land scarcely rises above the level of the sea. In the same manner as the limit, from which the vegetation assumes the forest or the alpine character, has its particular representatives in the kingdom of Flora, so also is the point where the meaner plants of the sea-shore cease, and give way to the nobler species, marked by its peculiar forms. It is remarkable that the plants which grow on all the shores of the new and old world, between the tropics, (*Rhizophora*, *Bruguiera*, *Conocarpus*, *Avicennia*,) with seeds shooting while attached to the parent plant, and branches striking into the earth, seem, by their roots above and below, at once to represent in their class also the image of that rich and generous vegetation which we admire in these latitudes. In like manner as all these plants belong to the sea-coast, so every principal river, the source of which determines more or less a peculiar vegetation, has a Flora of its own along its whole course, which forms one of the most important features in the physiognomy of the country through which it flows.

Thus we found on the shores of those immense rivers, the Rio de S. Francisco, the Tocantin, the Parnaiba, the Amazons and its collateral streams, certain species which mark the particular character of their vegetable forms, and are extremely interesting to the enquirer into the geographical relations of the vegetable kingdom, because they indicate, in a certain degree, the basis of the forms of each individual Flora. Those shrubs and trees which send out roots from their branches require to come into contact with the sea, in order to attain their perfect growth, and with their far-spreading and very superficial roots appear especially to affect the swampy soil of its shores. Though their wood is very solid, and not unfrequently thick, they grow with extraordinary rapidity. The *Rhizophora mangle* (*mangue vermelho*) is distinguished by forming a very thick bark in a proportionably short time. In those places where the scarcity of wood does not make it necessary entirely to cut down the mangle trees, as, for instance, in Maranhâo, it is usual, particularly at the commencement of the rainy season, when the sap begins to flow between the wood and the bark, to tear off the latter, and use it for tanning. Wherever these trees and shrubs grow, the whole neighbourhood is converted into marshes and swamps, and serves only as an abode for the abovementioned species of crab. On the summits of these forests, growing on the shore, we saw, as we sailed along, the most beautiful white herons * sitting, gay-coloured halcyons watching for fish †, and within the thicket divers waterfowl ‡ running about or swimming. Unluckily it is impossible to catch any of these animals as soon as they retire far into the thickets, because it would be vain to attempt to penetrate through the close bushes, or when the ebb leaves the ground visible, to venture upon it, on account of the depth of the swamp. We followed the Inhumerim about a mile up the country, till we reached the village Porto de Estrella, the low ill-built houses, or rather huts, of which form an irregular street at the confluence of the small Saracurúna with the Inhumerim.

Porto de Estrella is the common harbour between Rio de Janeiro, and the province of Minas Geraës. Long trains of mules laden with chests and packages arrive here from the interior, or return to it. The European, accustomed to the conveyance of considerable burdens in waggons, is astonished at the sight of so many cargoes divided into small parcels, which are abandoned to the discretion of the beasts, or of an unskilful driver, daily loaded and unloaded several times, either in the open air, or in exposed sheds, scarcely protected against the rain and the weather, and often carried in this manner several hundred miles. When we

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* Ardea alba, candidissima, egretta.

† Alcedo torquata, bicolor, Amazona.

‡ Para jacana; Gallinula martinicensis; Scolopax paludosa Gallinula affinis, nob.; Tringa Cinclus; Vanellus cayennensis.

beheld the confusion of the caravans, loading and unloading, we could not think without regret of the future fate of our instruments, books, and collections, which would be given up to blind chance, instead of being under our own care. The caravans (*tropas*), however, particularly on the better road from Saint Paul and Minas to the capital, are so well organised, that comparatively very little risk is to be apprehended. Each caravan, which may consist of twenty to fifty mules, is conducted by an Arieiro, on horseback; he gives the necessary orders for the caravan to set out, to halt, or to encamp for the night; takes care that the burdens are well balanced, and the pack-saddles (*cangalhas*) in good condition; repairs them when they gall, cures the sick beasts, and attends to the shoes. Under him are the drivers (*toccadores*), each of whom generally has to manage a division (*lote*) of seven mules. They go on foot, put the burdens off and on, feed and water the animals, drive them to the pasture, and cook the provisions. The Arieiro, generally a free mulatto, frequently attends to the sale and purchase of goods in the city, and acts as commissioner for the proprietor of the caravan. The drivers are for the most part negroes, who soon become accustomed to the employment, and prefer this wandering life to the labour of gold-washing, and working in the plantations. The most important article of trade brought hither by the inhabitants of Minas Geraës, called Mineiros, is raw cotton; but besides that, a considerable quantity of coarse cotton stuffs, for clothing for the negroes, and for exportation to Rio Grande do Sul and Buenos-Ayres, is brought hither, chiefly from the district of Sabará and S. Joâo d'El Rey; also cheese, bacon, and cakes of marmalade of quinces: many precious stones likewise come hither from the interior, and we were assured that a great contraband trade is carried on in gold dust and diamonds, though numerous police officers exercise great vigilance to prevent it.

As all the goods which are sent from Rio to Minas, Goyaz, and Mato Grosso, likewise have to go by Porto de Estrella, there is always a great deal of business going on here, and it is therefore very strange that there is not a single good dwellinghouse, or even any secure magazine for the goods. Every body must submit to take shelter in a wretched scarcely covered shed, where goods are likewise deposited. If the traveller does not carry his provisions with him, as is the usual custom, he must provide himself with what he wants from the vendas, of which there are some here, and must get his provisions dressed himself. The meal generally consists of beans, boiled with bacon, or of dried beef broiled; for dessert we have banians and cheese. The traveller sleeps upon an ox hide, or on a frame of laths fixed in the earth, and covered with a straw mat, or on his hammock, and no covering but his own clothing.

After our kind conductor had procured the necessary mules and horses for our journey, we left the busy village, and took the road which leads northwards from this place to Minas. We were soon in an entirely new scene; we rode through a low country, in a broad but unpaved road, between hedges of the most various kinds of shrubs in full blossom; on the left hand we had a range of mountains, covered with thick forests, and before us one connected with it, but higher; the bold projecting masses of rock, wooded only on the sides, give the landscape a character peculiarly grand. On this road, too, as formerly in the neighbourhood of the city, we met with no great plantations, which lie in the forests at a great distance from the road; but some scattered houses with gardens proved to us, that the fertility of this beautiful spot was duly appreciated. The broad valley, gently declining towards the sea, is protected from the cold winds, which come from the higher country on the river Paraiba, by the chain of the Organ Mountains (*Serra dos Orgâos*), and it likewise enjoys the advantage of being doubly warmed by the reflection of the rays of the sun from the mountain. In the lower grounds, the sugar-cane thrives with incredible luxuriance; and we saw a particular proof of the strength of the soil, in some stems almost a foot thick, which having been deprived of the branches and roots, divided into several pieces, and fixed in the ground to form a fence, had immediately taken root, and shot out new branches. They were stems of the pindaiba (*Xylopia frutescens*), and several crotons; this phenomenon is the more remarkable, because the pieces which were set in upside down grew as fast as the rest. While the experiments of the botanical physiologer in our ungenial climates afford him, only under hard conditions, an insight into the concealed processes of vegetation; Nature in these countries voluntarily solves those problems, and thus allows him to look into her mysteries. In this point of view, it would certainly be a very important undertaking, to repeat here, upon a more extensive scale, the experiments of Hales, Duhamel, Grew, and Knight, in order to deduce from them general laws of the growth of plants.

At Piedade, a village consisting of several scattered houses and a chapel, scarcely a mile from Porto de Estrella, we issued from between the thick hedges along the road, into a verdant plain bounded by gardens, plantations, and meadows, which were just then illumined by the brilliant rays of the morning sun; while in the back ground, the massy summits of the Organ Mountains, were veiled in the gloom of a forest, which was still in shade. A solemn soothing repose was diffused over this delightful spot, which seems to have been created for the enjoyment of retired and cheerful contemplation of nature. The variety of the light and of the foliage of the trees, which is seen on the forests, on the slopes of the mountain, the blending of the most diverse colours, and the dark azure and transparency of the sky, impart to the landscapes of the tropical countries a charm to which even the pencil of a Salvator Rosa and a Claude cannot do justice. The road gradually rises, and when, after passing over low woody hills, we arrived, towards evening, at the foot of the mountain, our hospitable friend bid us welcome on his own domain. Mr. Von Langsdorff had but just begun to cultivate this fazenda, which is of the great extent of more than a square mile, but had been entirely neglected. A spacious shed (*rancho*) for the reception of the numerous caravans from Minas, a venda, where brandy is sold, a mill for grinding maize, and a small dwelling-house for the proprietor, in the usual style of the country, were erected on the road-side. These small country-houses contain some plain rooms with latticed windows, or shutters; the roof generally projects on one side, some feet beyond the wall, and resting on some pillars, and a low wall, forms the veranda. Such buildings are commonly of lath connected together by tough creeping plants (*sipó*), covered with clay, and white-washed. The clayey soil may almost everywhere be made into good bricks, or, if they are considered too expensive, the broad leaves of several palms* make a light but tolerably secure roof. The bounty of nature supplies all the necessary materials in abundance, and only the lime is brought from Cabo Frio.

The estate of Mandiocca, of which we have given a drawing, is so called on account of the excellence of the mandiocca roots which are cultivated there. It is bounded on the north-west by a chain of mountains, traversed by several narrow dells, and covered with woods, which extend from the valley to the lofty summits of the Organ Mountain. In the midst of these great forests are the tracts (*rossados*) which, after burning the felled trees, are planted by the land-owners with mandiocca, maize, beans, coffee, &c. These plantations (*rossas*) are generally abandoned after a few harvests, and in some years are covered again with a thick brushwood (*capoeir*), which is particularly distinguished by the absence of large kinds of trees of a slower growth. The primeval forests, which stand as testimonies of the creative energy of the new continent, in all their original wildness, and still unprofaned by human hands, are called, in Brazil, virgin forests (*mato virgem*). In them, European coolness refreshes the wanderer, and at the same time the image of the most luxuriant profusion: the never-ceasing power of vegetation

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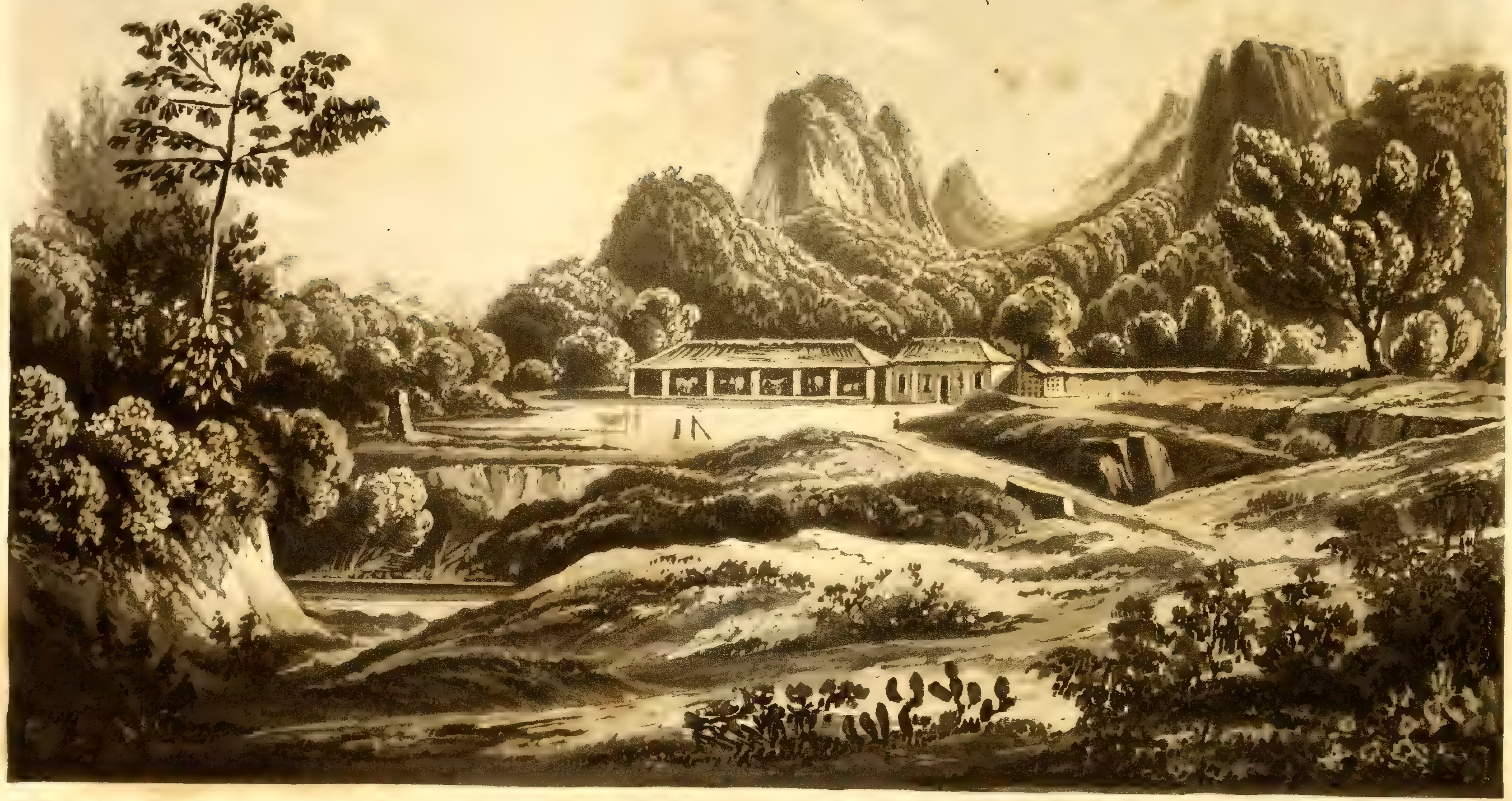
* Particularly in the southern districts the species Geonoma.



MANDIOCCA, THE FARM OF Mr. V. LANGSDORFF.

London, Published by Longman & Co. 23, March, 1824.

makes the trees shoot up to a majestic height; and not contented with these gigantic primeval monuments, nature calls forth upon every stem a new creation of numerous verdant flowering parasite plants. Instead of the uniform poverty of species in the forests of Europe, especially in the north, there is here an infinite diversity in the forms of stems, leaves, and blossoms. Almost every one of these sovereigns of the forest, which here stand near to each other, is distinguished in the total effect of the picture from its neighbour. While the silk-cotton tree *, partly armed with strong thorns, begins at a considerable height from the ground to spread out its thick arms, and its digitated leaves are grouped in light and airy masses, the luxuriant lecythis and the Brazilian anda † shoot out at a less height many branches profusely covered with leaves, which unite to form a verdant arcade. The jacaranda attracts the eye by the lightness of of its double-feathered leaves; the large gold-coloured flowers of this tree and the ipé ‡ dazzle by their splendour, contrasted with the dark green of the foliage. The spondias § arches its pennated leaves into light oblong forms. A very peculiar and most striking effect in the picture is that pro-

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* Bombax pentandrum, Ceiba, L.

† Lecythis Ollaria, parviflora, L.; Idatimon, Aubl.; Anda brasiliensis, Raddi.

‡ Jacaranda brasiliensis, Juss.; Bignonia chrysantha, Jacq.

§ Spondias Myrobalanus, L.

duced by the trumpet tree [*] among the other lofty forms of the forest. The smooth ash-grey stems rise, slightly bending, to a considerable height, and spread out at the top into verticillate branches standing at right angles, which have at the extremities large tufts of deeply lobated white leaves. The contour of the tree appears to indicate at once hardness and pliability, stiffness and elasticity, and affords the painter a subject equally interesting and difficult for the exercise of his pencil. The flowering cæsalpinia [†], the airy laurel, the lofty geoffrœa [‡], the soap trees with their shining leaves, the slender Barbadoes cedar, the ormosia [§] with its pennated leaves; the tapia or garlic pear tree, so called from the strong smell of its bark; the maina [||], and a thousand not yet described trees are mingled confusedly together, forming groups, agreeably contrasted by the diversity of their forms and tints. Here and there the dark crown of a Chilian fir [¶] among the lighter green appears like a stranger amidst the natives of the tropics, while the towering stems of the palms, with their waving crowns, are an incomparable ornament of the forests, the beauty and majesty of which no language can describe. If the eye turns from the proud forms of those ancient denizens of the forest to the more humble and lower which clothe the ground with a rich verdure, it is delighted with the splendour and gay variety of the flowers. The purple blossoms of the rhexia, profuse clusters of the melastoma, myrtles and eugenia* ; the delicate foliage of many rubiaceæ and ardisiæ† with their pretty flowers blended with the singularly formed leaves of the theophrasta; the conchocarpus; the reed-like dwarf palms‡; the brilliant spadix of the costus; the ragged hedges of the maranta§, from which a squamous fern rises; magnificent stiftia; thorny solana; large flowering gardenias and coutarea|| entwined with garlands of mikania and bignonia; the far-spreading shoots

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[*] Cecropia peltata, L. palmata, W.

[†] Cæsalpinia brasiliensis, chinata, L.

[‡] Geoffrœa inermis, Sw., racemosa, Poir. violacea, P.

[§] Sapindus Saponaria, L.; Cedrela odorata, L.; Ormosia dasycarpa, coccinea, Jacks.

[||] Cratæva Tapia, L., called by the Portuguese Páo d'alha; Maina brasiliensis, Raddi.

[¶] Araucaria imbricata, Pav.

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* Rhexia princeps, grandiflora, holosericea Humb.; Melastoma tomentosa, lutescens, mucronata Humb.; Myrtus splendens, disticha, lineata Sw.; Eugenia Mini, gujanensis, Cumete Aubl.

† Tetramerium occidentale G.; Nonatelia paniculata, Pagamea gujanensis; Coffea paniculata Aubl.; Duhamelia patens L., chrysantha Sw.; Ardisia tinifolia, parasitica Sw.

‡ Theophrasta longifolia Jacq.; Conchocarpus macrophyllus Mik.; Geonoma simplicifrons, pinnatifrons W., pauciflora nob.

§ Costus lævis R. P., spiralis Rosc.; Maranta gracilis, obliqua Rudge, arundinacea L.

|| Stiftia chrysantha Mik.; Solanum violaceum, micranthum Lam., violaceum Jacq. paniculatum L., Balbisii Dun., chloranthum Spr.; Gardenia armata Sw.; Solena gracilis Rudge; Coutarea speciosa Aubl.

of the mellifluous paullinias, of the burning dalechampias and the bauhinia with its strangely lobated leaves*; strings of the leafless milky bindweed (*Lianes*), which descend from the highest summits of the trees, or closely twine round the strongest trunks and gradually kill them: lastly, those parasitical plants, by which old trees are invested with the garment of youth; the grotesque species of the pothos and arum, the superb flowers of the orchideæ †, the bromelias which catch the rainwater, the tillandsia ‡ hanging down like *Lichen pulmonarius*, and a multiplicity of strangely formed ferns §: all these admirable productions of so young a soil, combine to form a scene which alternately fills the European naturalist with delight and astonishment.

When we here attempt to sketch a picture of the interior of a tropical forest, we must not forget to point the attention of the reader to the relative situation of each individual plant, with regard to the tendency to self-preservation. With such a fulness of life, and such a vigorous striving at development, even so rich and fertile a soil as this is not capable of furnishing the necessary nourishment in sufficient abundance; hence those gigantic trees are in a constant struggle for their own preservation, and impede each other's growth still more than the trees in our forests. Even the stems which are grown to a considerable height, and require a large supply of nutriment, feel the influence of their more powerful neighbours, are suddenly arrested in their growth by being deprived of the requisite juices, and thus become in a short time subject to the general powers of nature which lead them to a rapid dissolution. We thus see the noblest trees, after suffering an atrophy of some months' duration, eaten away by ants and other insects, seized with decay from the root to the summit, till, to the terror of the solitary inhabitants of the forest, they fall down with a tremendous crash. In general, it is remarked by the farmers, that stems which stand singly, among several others of a different kind, are more easily kept down by the latter. When at some future period a regular system of forest cultivation, which indeed has not yet been thought of in these thinly peopled woods, shall be introduced, it will be found necessary not so much to promote the growth of the trees close together, as to take care that they stand at a sufficient distance from each other.

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* Mikania stipulacea Vhl., viscosa Spr., opifera nob. (Eupator crenatum Gom); Bignonia venusta Ker.; Paullinia pinnata, Cururu L., meliæfolia, thalictrifolia Juss.; Dalechampia brasiliensis, ficifolia, pentaphylla, triphylla, convolvuloides Lam.; Bauhinia gujanensis Lam., aculeata L.

† Pothos crassinervia, digitata Jacq., macrophylla Sw., palmata L.; Caladium lacerum, pinnatifidum, grandifolium Jacq.; Oncidium barbatum, pictum Humb.; Ionopsis pulchella Humb.; Neottia speciosa Sw.

‡ Bromelia Pinguin, Karatas, Acanga, iridifolia Nees et M.; Tillandsia usneoides L.

§ Acrostichum calomelanos; Polypodium percussum Cav., submarginale, vaccinifolium Fisch.; Aspidium exaltatum Sw.; Pteris pedata L.

But the animal kingdom, which peoples those ancient forests, is no less distinguished than the vegetable world. The naturalist, who is here for the first time, does not know whether he shall most admire the forms, hues, or voices of the animals. Except at noon, when all living creatures in the torrid zone seek shade and repose, and when a solemn silence is diffused over the scene, illumined by the dazzling beams of the sun, every hour of the day calls into action another race of animals. The morning is ushered in by the howling of the monkeys[*] the high and deep notes of the tree frogs and toads[†], the monotonous chirp of the grasshoppers and locusts.[‡] When the rising sun has dispelled the mists which preceded it, all creatures rejoice in the return of day. The wasps leave their long nests which hang down from the branches; the ants[§] issue from their dwellings, curiously built of clay with which they cover the trees, and commence their journey on the paths they have made for themselves, as is done also by the termites[*] which cast up the earth high and far around. The gayest butterflies, rivalling in splendour the colours of the rainbow, especially numerous Hesperiæ[†], flutter from flower to flower, or seek their food on the roads[‡], or collected in separate companies on the sunny sandbanks of the cool streams.[§] The blue shining Menelaus, Nestor, Adonis, Laertes, the bluish white Idea, and the large Eurylochus with its ocellated wings, hover like birds between the green bushes in the moist valleys. The Feronia, with rustling wings, flies rapidly from tree to tree, while the owl[||], the largest of the moth kind, sits immovably on the trunk with outspread wings awaiting the approach of evening. Myriads of the most brilliant beetles buzz in the air, and sparkle like jewels on the fresh green of the leaves, or on the odorous flowers.[¶] Meantime agile lizards, remarkable for their form, size, and brilliant colours[**], dark-coloured poisonous[⸸], or harmless serpents, which exceed in splendour the enamel of the flowers*, glide out of the leaves, the hollows of the trees, and holes in the ground, and, creeping up the stems, bask in the sun, and lie in wait for insects or birds. From this moment all is life and activity. Squirrels, troops of gregarious monkeys† issue inquisitively from the interior of the woods to the plantations, and leap, whistling and chattering, from tree to tree. Gallinaceous jacus, hoccos, and pigeons‡, leave the branches and wander about on the moist ground in the woods. Other birds of the most singular forms, and of the most superb plumage§, flutter singly, or in companies, through the fragrant bushes. The green, blue, or red parrots ||, assembled on the tops of the trees, or flying towards the plantations and islands, fill the air with their screams. The toucan⊥, sitting on the

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[*] Mycetus fuscus nob.

[†] Hyla boans, aurantiaca D., Faber Neuw., aspera nob.; Rana cornuta, labyrinthica nob.; Bufo agua, margaritaceus D., scaber, leucostictus, dorsalis, ornatus nob.

[‡] Tettigonia Locusta, Gryllus.

[§] Formica leucosoma nob., grossa, megacephala.

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[*] Termes fatale L.

[†] Hesperia Aparte, Idas, Proteus, Bixæ.

[‡] Hesperia Fabius, Alcyonia, Numata P. Orythia, Doris, Flora, Læna, Psidii, Piera.

[§] A. Protesilaus, Ajax, Policaon, Thoas.

[||] Noctua Strix.

[¶] Entymus imperialis; Buprestis equestris, gigantea; Eumolpus nitidus; Clamys chrystallista nob. &c

[**] Ameiva lateristriga Cuv.; Tupinambis Monitor; Anolis violaceus nob.; Polychrus marmoratus Mer., Seps fragilis; Ophisaurus striatus nob.

[⸸] Bothrops Neuwiedii, leucurus nob.

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* Natrix Ahœtulla, cyanea, bicarinata nob., lacertina nob., plumbea Neuw., caninana; Elaps venustissimus, formosus Neuw., lemniscatus; Leposternon microcephalus nob.; Amphisbœna fuliginosa, alba, oxyura, vermicularis nob.; Cœcilia annulata nob.

† Midas Rosalia Lin.; Cebus xanthocephalus nob.; Brachyteles macrotarsus nob.; Sciurus æstuans.

‡ Penelope Marail, cristata; Crax Alector variet. Columba frontalis.

§ Falco brasiliensis, Sparveri; Strix flammea, Huhula V.; Vultur Aura; Crotophaga Ani; Tanagra auricapilla Neuw., brasilia, Jacapa, Mississipensis; Euphone tricolor, violacea; Emberiza brasiliensis; Fringilla flaveola; Loxia grossa; Lanius undulatus, lineatus, nævius, atricapillus, Nycthemerus nob.

|| Psittacus brasiliensis, menstruus, viridissimus nob., cruentatus Neuw., auricapillus, severus, militaris.

⊥ Rhamphastos Tucanus, dicolorus; Pteroglossus Aracari, Bailloni V.

extreme branches, rattles with his large hollow bill, and in loud plaintive notes calls for rain. The busy orioles[*] creep out of their long, pendent, bag-shaped nests, to visit the orange trees, and their sentinels, announce with a loud screaming cry, the approach of man. The flycatchers[†] sitting aloof, watching for insects, dart from the trees and shrubs, and with rapid flight catch the hovering Menelaus or the shining flies as they buzz by. Meantime, the amorous thrush[‡], concealed in the thicket, pours forth her joy in a strain of beautiful melody; the chattering manakins[§], calling from the close bushes, sometimes here, sometimes there, in the full tones of the nightingale, amuse themselves in misleading the hunters; and the woodpecker[||] makes the distant forests resound while he picks the bark from the trees. Above all these strange voices, the metallic tones of the uraponga[⸸] sound from the tops of the highest trees, resembling the strokes of the hammer on the anvil, which appearing nearer or more remote according to the position of the songster, fill the wanderer with astonishment. While thus every living creature by its actions and voice greets the splendour of the day, the delicate humming-birds*, rivalling, in beauty and lustre, diamonds, emeralds, and sapphires, hover round the brightest flowers. When the sun goes down most of the animals retire to rest; only the slender deer, the shy pecari, the timid agouti, and the tapir† still graze around; the nasua and the opossum, the cunning animals of the feline race‡, steal through the obscurity of the wood watching for prey, till at last the howling monkeys, the sloth with a cry as of one in distress, the croaking frogs, and the chirping grasshoppers with their monotonous note, conclude the day; the cries of the macuc, the capueira, the goat-sucker§, and the bass tones of the bullfrog announce the approach of night. Myriads of luminous beetles now begin to fly about like ignes fatui, and the blood-sucking bats * hover like phantoms in the profound darkness of the night.

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[*] Oriolus minor, niger, hœmorrhous, albirostris Az.

[†] Cuculus cayennensis; Galbula viridis; Trogon Curucui, viridis; Bucco cayennensis, leucops, tenebrosus Illig.; Capito melanotis T.; Muscicapa sulphurata, cayennensis, audax, virgata; Pitangua.

[‡] Turdus Orpheus, brasiliensis.

[§] Pipra leucocilla, erythrocephala, strigilata Neuw., Manacus, pareola.

[||] Picus flavicans, lineatus, robustus, Langsdorffi nob.; Yunx minutissima; Dendrocolaptes scandens, Picus, turdinus, guttatus.

[⸸] Procnias ventralis et nudicollis Illig.

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* Trochilus ornatus, Mango, Maugæus, leucogaster, viridissimus, mellisugus, amethystinus, hirundinaceus nob., crispus, pygmæus, brevicauda, albo-gularis, leucopygius, Helios, Mystax nob.; Grypus ruficollis nob.

† Cervus mexicanus; Cœlogenys Paca; Dasyprocta Agouty, Acuschy; Cavia aperea; Lepus brasiliensis; Tapirus americanus, var. rufa.

‡ Nasua Quasie, rufa; Didelphis cayopollin; Felis onca, discolor.

§ Bradypus tridactylus; Tinamus noctivagus Neuw.; Perdix guyanensis; Caprimulgus albicollis.

Inanimate nature too presents a beautiful and sublime picture in its long-extending mountain ridges, thickly wooded to the summits. The Serra dos Orgâos, and all the parts of the same range, which, branching out in different directions, runs along the sea-coast northwards through the district of Canta-Gallo to Porto-Seguro and Bahia, and southwards to Santos, &c., consists of granite. In the forest of Mandiocca, towards the mountain, there are uncommonly large blocks of this kind of rock, which have rolled down from the summits of the mountains; their clefts afford shelter to numbers of coatis and black weasels †; and a great variety of begonia, heliconia, and drostenia grow under their shady projections. At the first sight we fancied both here and in the neighbourhood of Rio that we saw the granite, which in our own country forms the mountain chain from Passau along the frontiers of Bohemia, so extraordinary is the resemblance between that in the new world and that in the old. Among the few varieties which we had occasion to observe, one consists of much reddish or light smoke-coloured felspar, a little smoky quartz, and pretty much black small

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* Vespertilio brasiliensis Geof.; Glossophaga amplexicauda Geof.

† Mustela barbara.

foliated mica. The second is a coarse-grained granite, with predominant greyish and reddish white felspar, greyish white, and smoky quartz, and a small portion of pinchbeck-brown and black mica. It approximates the more nearly to the graphic granite, as the felspar, in many places, has the lustre of mother of pearl. The most beautiful variety is a granite with much light reddish grey felspar, small-grained smoky quartz, and imbedded in it single equi-angular six-sided prisms of pinchbeck-brown mica of a middling size. The granite about Rio de Janeiro, as is always the case in similar mountains, often consists of earthy felspar of a greyish colour, sometimes spotted of a brownish yellow by oxyd of iron, smoky quartz, and but a little black mica, and at the slightest touch crumbling to pieces. The structure of the granite gradually becomes slaty, because the smoky quartz and the black small foliated mica (not so much the smoky felspar) combine, and the rock passes into gneiss. In this granite-gneiss pretty large noble garnets are generally found imbedded, and give it a beautiful appearance. It is chiefly found near the city, for instance about the Sacco d'Alferes; but, according to the observation of our friend and countryman, Mr. Von Eschwege, appears in many places along the sea-coast, and seems, for example, in Ilha Grande, to alternate with the granular granite. The latter is often cut into square stones in Rio de Janeiro, particularly in

Catête and Bota-Fogo, where large blocks lie exposed. The negroes, who perform this work, proceed with a degree of slowness intolerable to a European, making the holes for boring with long iron rods, which they always let fall on the same spot. With respect to the formation of the mountains in these parts, the land rises along the coast either gradually, and the granite in the whole chain forms only gently rising rounded hills of unequal elevation, or immense conical mountains here and there rise immediately from the sea to a considerable height, which, however, appears never to exceed four thousand feet. They are almost everywhere covered by a pretty thick stratum of a red ferruginous clay; which however we do not venture to determine more precisely, and which, if we may believe the assurance of many of the inhabitants, contains gold. As royal ordinances prohibit washing for gold within twenty miles of the sea-coast, no certain information can be obtained respecting the quantity of gold that might be found in this tract.*

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* It may be proper to state that we have had no opportunity of observing the numerous substances which (according to the "Nachrichten von den K. K. Österr, Naturforschern en Brasilien," Brünn, 1820, p. 165.) occur in the granite of Rio, in addition to its usual component parts, either admixed or imbedded in and on the rifts of this rock. But though no rose-quartz, shorl, beryl, asparagus-stone, Andalusite, dichroite, titanium, sparry iron-stone, brown and yellow iron-stone, pyrites, or molybdena have been noticed by us, we yet are warranted

From Mandiocca, the road for the caravans to Minas Geraës passes between grotesque stems of the aloe (*Fourcroœa gigantea*, Vent.) and hedges in full blossom, through the forest, by the edge of steep precipices, and gloomy clefts thickly grown with wood to the top of the mountain, to which there is an expensive paved road, at present the only one of the kind in Brazil, nearly a mile in length. But at the end of this road there is no longer any possibility of using carriages, which could not be employed without danger on the rugged roads. In Brazil they think as little of facilitating the intercourse by means of good roads and carriages, as we do in Germany of laying down iron rail-ways; the conveyance of goods upon mules being sufficient for the wants of the inhabitants. From the summit of the mountain called Serra de Estrella, 3376 Paris feet above the level of the sea, there is a prospect of the bay with its verdant islands and the city in the back-ground. On the opposite side there is a more limited view of a hilly, very uneven, thickly wooded tract, which extends from this place along the coast to the Rio Paraiba. The mountain road on the north side first leads to

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to infer the presence of, at least, the greater part of the above minerals in the Brazilian granite, from its resemblance to that of the N.E. frontiers of Bavaria, in which we find imbedded dichroïte and turmaline, veins of rose or milk quartz, and mica-slate, accompanied by Andalusite.

Corrego Seco, a poor village 2260 Paris feet above the surface of the sea. We once passed the night here in the miserable public house, which gave us, in every respect, a foretaste of the difficulties of a journey into the interior. A meal consisting of the dried flour of the mandiocca root and tough beef dried in the sun, a hard bench without pillow or covering for a bed, put our patience, and ability to endure the fatigues of the expedition, to the proof. In Germany this would have been one of the finest summer nights, as the thermometer was not below 14° of Reaumur, and yet we found it almost impossible to sleep for the cold. It is a fact, as remarkable as it is generally observed, that a few months' residence in a warm climate are sufficient to give the frame an extraordinary sensibility to the gradations of warmth. It probably proceeds from the increased action of the nervous system, which is a natural consequence of the great stimulus of the light and heat. This intensity of irritation, and the vivacity of all the organic functions during the day is followed, when night sets in, by a considerable relaxation of the organic powers, so that only the coolness can brace the limbs anew. As the sun in these latitudes exercises its influence with more energy than in our country, and all nature therefore during the day is, if we may so express ourselves, more awake; so, on the other hand, as soon as it sinks below the horizon, more profound repose and deeper sleep succeed. The animal kingdom, too, sleep here more soundly and longer than in more northern latitudes; and even the plants, by closing and drooping their flowers and leaves, announce, more than among us, a suspension of the animation awakened by the sun.

From Corrego Seco we followed the road through a high broken country, partly bounded by massy granite mountains, passed Belmonte, and at last reached the country-seat of Padre Correa, with whom we had become acquainted when he passed through Mandiocca. This worthy ecclesiastic, a native of Brazil, is a model for his neighbours, by his activity as a farmer. He has proved by planting extensive nurseries, that the colder climate of these more elevated districts is favourable to the culture of European fruits. In his plantations, figs, peaches and grapes in particular, ripen to perfection, and in such abundance, that he supplies the market at Rio, and annually gains large sums by the sale. This enterprising man has established another profitable branch of industry by the skill of his slaves, whom he treats with very great humanity, and who manufacture large quantities of Swedish iron into horse-shoes, and other articles for sale. We here met for the second time with the mountain rivulet of Piabanha, which, though pretty considerable, is not navigable, on account of its rocky bed, to its junction with the Rio Paraiba, which has its source far off in the province of S. Paulo. Passing over hills of gneiss and granite, which are covered with a layer of red clay, we arrived in the evening at Soumidouro, a small village with a few houses, situated in the middle of the wood, at the source of a mountain stream. We were hospitably received, and informed that we had still half a day's journey from this place to the military post (*destacamento*) of Paraiba; where all caravans coming from Minas Geraës, and the passports of all travelling strangers who are going into the interior of that gold district, are most strictly examined on account of the smuggling trade carried on in gold dust. To avoid this search, we advanced into the forests, which are here so unfrequented and gloomy, no farther than to a solitary fazenda, which lies at a small distance from the river Paraiba. After we had partaken of some refreshment, and obtained all the information that was desirable, both from the host, and from some of the mulattoes belonging to the customhouse on the Paraiba, who were patrolling in the neighbourhood, armed with swords and muskets, we prepared to return by the way of Soumidouro, to the country-house of Mr. Von Langsdorff.

During our stay at Mandiocca, our kind host was visited by his neighbours, who regarded with surprise, and not without jealousy, the rapid progress of his establishment. As the first attempt to turn up, with a European plough, the spots which had been cleared by burning the wood, had failed, through the awkwardness of the negroes and for want of oxen trained to the work, this gave them sufficient ground to prove the unfitness of European agriculture on the Brazilian soil. Many had not yet seen a plough; some would not allow the justice of the observation, that the soil gained in fertility by being loosened, and by the chemical influence of the atmosphere, because the virgin forests, the surface of which had been the same for thousands of years, afforded the most fertile land; others doubted whether the oxen, which Mr. Von Langsdorff had procured from Minas, possessed strength to bear, even for a few days, the hard labour of ploughing; some again lamented the loss of time of the negroes that must be employed. In truth, the use of the plough in these and the more northern districts which cultivate no corn, and have not yet lost their original fertility, appears less to be recommended than in the capitanias of S. Paulo, and Rio Grande do Sul. As the productions of the earth chiefly cultivated here are not sown but planted, and on that account do not require the surface of the ground to be so uniformly prepared, the negro works with the hoe much more effectually and easily than it would be possible for him to do with the plough, the use of which is besides rendered more difficult by the many roots, and the unburnt trunks remaining in the plantations. Though our friend had at present only about twenty negroes, he had not only secured the subsistence of his family by the cultivation of maize and mandiocca, but was even able to send part of his produce to the city for sale. His greatest hope, however, was founded on the coffee plantation which he had just made. As a proof of the general fertility of his estate, he several times treated us with potatoes, which were of excellent quality. In fact, the farmer in these districts has no reason to complain of want of fertility and productiveness in the soil, if he only takes care to choose for the plantations, those spots which can be properly watered, and is sufficiently acquainted with the nature of the soil adapted to each branch of agriculture, as well as the proper seasons. The mandiocca root thrives very well in the whole province, except in low wet grounds, and does not require much care in the cultivation. The cuts (*manibas*) should be put into the ground when the weather is temperate, neither too cold nor too hot, and generally begin to shoot in fourteen days; in eighteen or twenty-two months, during which time the farmer endeavours above all things to check their growth upwards, by breaking out the buds, the roots have attained their full size. Each plantation usually yields three crops at the most, and is then abandoned. The maize, which generally produces two hundred fold, is planted at the commencement of the rainy season, and gathered at the end of four or five months; many kinds of beans come to maturity with still greater rapidity. Garden herbs, Spanish potatoes, and melons, produce through the whole year, but most abundantly, however, during the wet season. The pisang, guava, oranges, &c., blossom in the rainy season from October to March, and produce fruit in the dry season.

In this climate, as in all others, unfavourable influences are not wanting which are hurtful to the plants. The finest orange groves frequently fall a prey to the brown ants which gnaw off the bark, or to the mole-crickets which devour the roots. The young mandiocca and sugar plantations are often invaded, stripped of their leaves, and laid waste, by similar enemies in incredible numbers, or deprived of their roots by the wasps which live under ground. But even when the crop has happily reached maturity, the owner must share it with many foreign guests. Swarms of monkeys, flocks of parrots and other birds, attack the plantations; the paca, agouti, and other kinds of wild swine, eat up the leaves, stalks, and fruits, and myriads of tenthredoes injure the crop. The planter himself, particularly if he has just arrived from Europe, and is unaccustomed to this climate, has many hard trials to undergo from tormenting animals. If he does not keep his dwelling closed, particularly in the morning, evening, and night, there are swarms of large and small musquittoes which torment him with their stings, even through the thickest clothes, and only gauze or silk, can secure him against these enemies. The earth-flies

(*Pulex penetrans*), which are concealed in numbers in the sand, penetrate under the nails of the hands and feet, and, by producing a blister filled with little eggs, cause the most painful sensations, which, if the sympathetic swelling of the inguinal glands is neglected, are often followed by mortification. The blister, as soon as it gives pain, must be carefully removed, and snuff rubbed into the wound. Besides these, the inhabitant often has other enemies in his house; the white-bellied ant (*Cupim, Termes fatale*), a great number of blattæ (*Blatta orientalis*), and other vermin, continually oblige him, by their destructive fury, to make new arrangements. The first cause the most terrible devastation wherever they pass in their course; for, metals excepted, they gnaw through everything, and in a few days the beams of the house are rotten, the linen, books, and all the household furniture, are destroyed. The blatta commits great destruction among the vegetables in particular, and in the night, even attacks the tips of the fingers. The injury which these animals cause to the naturalist is extremely distressing; he frequently finds his collections, which he thought quite secure, by being carefully shut up and hung against the wall, destroyed in a single night. Taught by repeated experience, we found the only safe means to be the application of Buffon's arsenic salve, wrapping the parcels in linens dipped in oil of turpentine, and depositing them in tin cases, which were soldered before they were sent away. Without are numberless enemies, not to mention the savage ounce, the poisonous serpents, lizards, scorpions, centipes, and spiders; which are fortunately not frequently met with, and only wound a person when provoked: the mite (*acarus*), called carobatos, is one of the most formidable plagues. These little animals, from the size of a poppy-seed to that of a linseed, live in societies, and crowded by hundreds in the grass and on dry leaves. As soon as the traveller touches such a plant, they very quickly penetrate through his clothes to the skin, where they eat in, particularly in the more tender parts, and cause an intolerable itching, which is increased by the inevitable rubbing, and in the end produces an inflamed blister. The securest remedy immediately to get rid of these teasing enemies is to pick them off from the skin, or if they have not already eaten too far in, to kill them by rubbing with brandy, or with tobacco infused in water, or by fumigating with tobacco over the fire. Only those who have themselves experienced this evil, so common in the torrid zone, can form an idea of the sufferings to which the naturalist, who is constantly in the open air, is exposed. Happily all these inconveniences are of such a nature that they may be greatly diminished, if not wholly removed, by a knowledge of the country, and the application of approved remedies. With the increasing population and cultivation of the country they will gradually diminish. When the inhabitants have cut down the woods, drained marshes, made roads, everywhere founded villages and towns, and thus by degrees triumphed over the rank vegetation and the noxious animals, all the elements will willingly second, and amply recompense the activity of man. But before Brazil shall have attained this period of civilisation, the uncultivated land may yet prove a grave to thousands of adventurers. Attracted by the constant beauty of the climate, the richness and the fertility of the soil, many leave their native land, to seek another home in a foreign hemisphere, and in a quite different climate. However true the suppositions are on which they found the expectations of a happy result of their enthusiastic enterprise, it is far from realising the hopes of the emigrants, especially those from the north of Europe; and how shall the inhabitant of the temperate zone, suddenly removed as a cultivator of the soil to Rio de Janeiro, or perhaps even to the shores of the Amazons, to a foreign climate, a foreign soil, a new mode of life and subsistence, surrounded by Portuguese, whose language he neither understands, nor easily learns, how shall he be happy and maintain himself in this country? And what in particular must people of the lower classes feel, without general education and aptitude for a new language, mode of life, and climate, when even strangers of superior condition, provided with every means of guarding against inconvenience, alarmed at the disagreeable circumstances attending the climate, complain of the few resources, the poverty and the plagues of the country, of which we have latterly heard so much? If the poor colonist who has come from a northern climate does not meet with a fellow-countryman as his guide, who, acquainted with the mode of life and the cultivation of the soil, kindly assists him in word and deed for the first few years, he is exposed to perish of hunger, even in this rich country, and from the feelings of repentance and longing after home which ensue, becomes a victim to his experiment. He, however, who has happily passed over the first trials, who has secured a settlement in the beautiful country of Brazil, and accustomed himself to the tropical climate, will most willingly acknowledge it for his second home; nay, if he has again visited Europe, he will, with increased attachment, wish himself back again; and, notwithstanding the doubts generally entertained of the habitableness of the torrid zone, will celebrate Brazil as the fairest and most glorious country on the surface of the globe.

After several days' stay at Mandiocca, we returned by the same road to the city, where we found ourselves deceived in the hope of meeting with the Portuguese squadron, which was to bring over her imperial highness the Princess Royal. This delay had considerable influence on the plan of our journey. It had probably been taken for granted at Vienna, that the whole company of naturalists would commence their expedition into the interior together; but as hitherto only professor Mikan and Mr. Ender were present, and resolved to wait for the remaining naturalists, no arrangement could yet be made for a joint expedition. We, on the other hand, had received by Count Von Wrbna, who, in the second month after our arrival, had brought the news that the marriage of the Princess Royal with his royal highness the crown-prince, Don Pedro, had been celebrated by proxy, orders not to prolong our journey beyond the term of two years. Penetrated by the wish to extend our travels through so unknown yet remarkable a country, as far as it should be possible in this space of time, we took the resolution to commence our journey into the interior this year, and thought that the delay in the arrival of the other naturalists should not induce us to spend our valuable time in the capital, the environs of which have been so frequently explored. Professor Mikan, on the other hand, resolved to travel round the Bay of Rio, in its whole extent, and to turn towards the plains about Cabo Frio, and in the district of Goytacazes.

Ever since our arrival in this country we had enjoyed the finest weather. But the rainy season seemed gradually approaching; the temperature became variable; fogs, thick groups of clouds, and sudden gusts of wind were more frequent; and on the 3d of October the rain fell in torrents, and continued without intermission for three days. From this time it rained more or less every night or afternoon, and, lastly, in November the wet season regularly set in. In this part of South America it is generally calculated to last from October to March; and the earlier or later commencement of it in the several places partly depends upon their latitude, and their natural position, whether nearer to or more remote from the coast, more or less elevated above the sea. At Rio itself, in 22° 54′ 10″ south latitude, 45° 5′ west longitude of Paris (eastern variation 4° 55′), it rains the most in February. During our stay the changes in the atmosphere were not inconsiderable; in the months of September, October, and November, the barometer, when at the highest, was 28.2, 28.30, and 28.20; at the lowest 27.76, 27.85, 27.77: mean height 27.995, 28.031, and 28.034: the thermometer in the two first months was at its highest points 22°, in the third 23.49° R.; at its lowest 15.49°, 16°, 18°; its mean height was 19.198°, 18.394°, and 20.49°: the hygrometer gradually rose from 49° to 76° and 85°, as the rainy season advanced. We did not think it advisable, considering the shortness of the time allowed us for our travels, to wait at Rio till this season was past; and though a journey during the wet months must be doubly fatiguing, we however determined to set out for the interior as soon as possible, as we considered that it was precisely with the commencement of the rainy season, that the animal and vegetable kingdom revive, and appear in their greatest perfection. In such an expedition to the interior, we had been preceded of late years by several travellers. Mawe, who came from Buenos Ayres to Rio de Janeiro, by way of S. Paulo, had continued from hence his journey to Tejuco, in the Diamond district; Von Eschwege, setting out from his residence, Villa Rica, had penetrated westward from the Rio de San Francisco to Rio Abaité, where he worked a lead mine; his serene highness the Prince of Neuwied was at that time travelling along the sea-coast from Rio to Bahia, with Messrs. Freyreiss and Sellow; Auguste de Saint Hilaire who had travelled a year before with Mr. Langsdorff to Villa Rica, after the latter had been obliged to return on account of business, and visited several other parts of the province of Minas, the Indian settlements of Passainha, Tejuco, and the Rio de S. Francisco, at Salgado, was just then on his return to the capital.

Considering these men as our predecessors, and on a review of all written and verbal information, it appeared to us the most advisable first to undertake a journey to the southern capitania of S. Paulo, by which we chiefly designed by degrees to accustom ourselves to the climate of hot countries, and to make ourselves at the same time acquainted with the southern temperate zone. From the province of S. Paulo we intended to travel through the interior of Minas Geraës as far as to the river San

Francisco and to Goyaz; lastly, either to proceed from hence by the river Tocantin to Pará, or to return from the interior to Bahia and the coast, there to embark our collections for Europe, and then to penetrate again into the interior of the provinces of Piauhy and Maranhâo, and thus at length to reach Pará, the object of our wishes. On this journey, through a part of the temperate and the whole of the south torrid zone, we hoped that we should be able to take a comprehensive view of the latter, and its manifold productions, and to make interesting comparisons between the several kingdoms of nature, in different latitudes. This plan was determined upon with courage and expedition. Our friends who were acquainted with the country doubted our success in an undertaking which they likened to the flight of Icarus; but they could not lessen our own confidence, guided by which we indulged in the pleasing hope of a happy termination of our labours.

Our stay at Mandiocca, and our excursions in the environs, had made us acquainted with most of the requisites for such a journey by land. Our first care, therefore, was to procure a troop of mules, and the most necessary provisions and utensils which every traveller in this country mustabsolutely have with him, in which we profited by the advice of several Mineiros who had just come to Rio with their caravans. The first requisite, as we were told, was an Arieiro, to whom we should confide the care of the mules and the baggage. But we soon discovered that it was difficult to find a serviceable man of this kind, and still more difficult to attach him to our interest. After several fruitless attempts to procure a well-qualified person we were compelled, as the time fixed for our departure was near at hand, to confide the troop to a mulatto, who, though without sufficient guarantee, declared himself acquainted with the employment, and we gave him our negro slave and another, a free negro, as assistants. How much this involuntary arrangement would impede our journey in a strange country, and frequently place us in the most disagreeable situations, we could not at that time indeed foresee, otherwise we should willingly have purchased, with some weeks' delay, the possession of an able and well-disposed guide. This want of a confidential trustworthy guide, well acquainted with the road, was more sensibly felt by us, when our German servant, on the evening previous to our departure, declared that he would not upon any terms accompany us on such a long and dangerous expedition to the savages, but would rather remain behind among Christians.

During the preparations for our departure, Her Imperial Highness happily arrived at Rio de Janeiro on the 5th of November. What joyful feelings animated us when we saw the august princess make her glorious entry into the capital of the infant kingdom, and were witnesses of the transports of joy with which a happy people welcomed the first German princess to a throne of the new continent. Our long-expected colleagues, too, the Austrian naturalists, were now likewise arrived, and we hoped that we should commence our journey in their company. This wish, however, was not accomplished, because the Austrian embassy declared that our learned countrymen should remain a longer time in the province of Rio de Janeiro. We were therefore compelled to prosecute our plan of travelling into the provinces of S. Paulo, Minas Geraës, Goyaz, and Bahia alone, and on the application of the Austrian embassy, soon received from the Brazilian government the necessary passports and letters of recommendation. All the preparations for our enterprise were completed in the beginning of December, and the moment to leave the capital was now arrived. With great emotion we took leave of friends and countrymen, to whom we were united by sincere attachment and similarity of pursuits, and set out upon our journey into the interior of the country, and first to the province of S. Paulo.

CHAPTER III.

JOURNEY FROM RIO DE JANEIRO TO THE CITY OF S. PAULO.

We left Rio de Janeiro on the 8th of December, 1817. Several of our countrymen and friends accompanied us to the distance of half a mile * from the city. The commencement of this expedition was not calculated to inspire us with sanguine hopes. Scarcely had we turned into the broad high road of Santa Cruz, when some of our mules lay down, some dispersed among the houses and gardens, and others threw off their loads, and endeavoured to run away. The confusion increased when Mr. Dürming, the Prussian consul at Antwerp, who had arrived at Rio de Janeiro, and who then formed one of our party, was thrown from his mule, which took fright. Mr. Dürming's arm was so seriously hurt, that he was obliged to be taken back to the city. The animals always run wild in this manner at the commencement of a

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* Here, and in the course of the narrative, Portuguese or Brazilian miles are always meant, eighteen of which make a degree.

journey, till they have become used to their burdens, and to proceed in a regular train. Our countryman, Mr. Von Eschwege, who had already made many excursions in this country, was the only one who did not regard it; but we, being novices, were filled with uneasiness and alarm. The latter increased when we perceived that one of the mules, whose load was also very valuable, did not make its appearance. It had run back into the city, with its cargo, where it would probably have soon found another master, if the Arieiro had not been so fortunate as to discover it at last in the harbour, already in the hands of strangers, and to bring it back to us. Fatigued by the troublesome search, and riding backwards and forwards, we were obliged, though scarcely a league from the city, to halt near the royal country-seat of S. Cristovâo, in order to collect the scattered mules and drivers. After we had passed the greatest part of the day here in anxious expectation, we at length set out again with our caravan in good order, crossed the side roads leading to Canta-Gallo and Minas, and at sunset, reached Campinho, a fazenda, with a venda attached to it, situated about three leagues from Rio, where the necessary provisions for the passing caravans are sold. Such shops are met with on the greater part of the road from Rio de Janeiro to S. Paulo, and to the principal places in Minas Geraës, and as the plantations lie in the moist tracts, or in the forests far from the road, these are very often the only places which put a traveller in mind of Europe, and of European accommodations. The road runs in a direction of S.S.W. through low land, into which the sea, at high water, penetrates pretty far in some places. By the side of the road stood several low palms, in full bloom, and filled the air with a smell like spermaceti.* We lay down to rest for the night on ox hides, which during the day were spread over the cargoes of the mules, but were now laid on the ground in the entry, which was sparingly lighted by a lamp. The mules having been fed with maize, in bags hung to their heads, and led to drink in the next pool, were sent to pasture. For this purpose, both here and on the whole road to S. Paulo, they use either free open spots, or places that are fenced in. In order that the animals may not run away, and be immediately found the next day, travellers generally prefer putting them into enclosures, which are let on very reasonable terms. When the meadow is not fenced in, it is usual to secure the beasts, by tying ropes to their fore feet. Meantime, our people collected wood and water, and prepared the frugal meal, consisting of dried beans, bacon, and dry beef. The night was starry, but the firmament was darker than in our European zone. The thermometer stood at 14.60° Reaumur, during the greatest part of the night; a temperature which, together with the hard bed on the cold stone floor, was enough to put us in mind of Spanish inns. At daybreak we continued our journey over low land, but did not reach the royal country-seat of Santa Cruz, which is five leagues and a half from Campinho, because our Arieiro insisted on making the first day's journey short, in order to accustom the animals by degrees, and without injury, to travelling. We therefore passed the night in the Venda O Santissimo, where the old proprietor, an Italian by birth, related to us how he had come to Rio, on board a French ship, which had been sent on a voyage of discovery into the South Sea, from which he had deserted and afterwards settled in the country. Thus we unexpectedly met with one of the companions of Bougainville, who after this long separation from Europe, had not only forgotten the language of his country, but even European manners.

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* In the East Indies the pollen of the cacao palm is used as an aphrodisiacum. The component parts which Fourcroy found in the date palm, (Annales du Mus. i. p. 417.) certainly indicate the animal nature of this substance.

On our way hither we remarked a tract of ground, consisting of dry granite sand. The low, but very pleasant wood * which covers it, resembles, by its bright green foliage, our laurel groves, but is

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* Schinus Aroeira, terebinthifolia Raddi; Pohlana (Langsdorffia Leandr.) instrumentaria nob.; Spixia heteranthera Leandr.; Byrsonima nitidissima Humb.; Sapium ilicifolium W.; Alsodea Physiphora nob.; Petrea racemosa Nees.; Solena grandiflora; Serianæ, Paulliniæ sp. &c.

characterised on the other hand, as a production of the tropical climates, by the variety of the forms of its far-spreading garlands of flowers. We saw in the ravines some boulders, and rolled pieces of greenstone, which lie scattered on the granite ground. On the morning of the 10th of December, having traversed only well-watered meadows, we arrived at Santa Cruz, and were received in the most friendly manner, by our countryman, Lieutenant-colonel Feldner, who happened to be then on the spot. This little place with a population of a few hundred inhabitants, and which only a short time before had received from the king the title and privilege of a town, is situated on a flat sandy eminence, entirely surrounded by a marshy plain, and consists, with the exception of the royal palace, of nothing but wretched clay huts. The principal building, formerly the property of the Jesuits' college at Rio de Janeiro, and at present belonging to the crown-prince, Don Pedro d'Alcantara, to whom it was given by his father, contains the necessary accommodation for the royal family and is surrounded by some dependent buildings. Notwithstanding very extensive pasture grounds, an extraordinary stock of cattle consisting of several thousand head, a number of nearly a thousand negro slaves, who are designed for this estate, and notwithstanding the predilection of the court for this seat, this rich domain is still in the same neglected state in which Mawe found and described it several years ago. They have not yet succeeded to make a dairy in the European manner, and the king, who possesses in his very neighbourhood one of the finest herds of cows, must content himself with Irish salt butter, which has performed a voyage of several months. The advantages which such an establishment would produce for the cultivation for the whole province, if it were arranged so as to serve as a model, are beyond calculation. The greatest part of the cattle bred here, are derived from such as were imported long ago from Portugal, but no care has been taken to improve them, by bringing others from Rio Grande do Sul, where, in a state of perfect freedom, they attain an extraordinary size and strength. These cattle, therefore, are in general smaller and worse-looking than those which we see grazing, half-wild, in the pastures of S. Paulo, or driven in great herds from Rio Grande to the north. They are for the most part of a dark brown colour, the horns but slightly bent and not large. It is certain that the cows, in hot climates, give less milk than in ours, and it is therefore entirely left to the calves, who suck for a long time. Even European cows here gradually lose their milk; a fact which is probably to be explained only by the predominant action of the cutaneous system and increased perspiration.

In order to improve the estate of Santa Cruz, the late minister, Conde de Linhares, assigned dwellings to a part of the Chinese colonists, who had been brought to this country. Only a few of them were now there, most of them having gone into the city, to carry about for sale, little articles of Chinese manufacture, particularly cotton and fire-works; sickness and regret for their native country had carried off many of them, and dislike to their situation induced others to disperse. Those who still live here, have made round their low huts, which are kept very neat inside, little plantations, which they adorn with coffee and their favourite flower, the jessamine. It is well known, that the Chinese in their own country, follow agriculture with great skill and care, and are even well acquainted with the art of horticulture. We were, therefore, surprised at this place, where a considerable number of Chinese had been settled for the purposes of agriculture, to find so few traces of their labours. The botanic garden or nursery, on the declivity of a hill, almost resembles a desolate wilderness; and the kitchen garden near the palace, being situated in a lower and moister spot, is indeed more thriving but not better attended to. They showed us a branch of grumijama (*Myrtus brasiliensis*), which, after it had attained a considerable height, had been taken in the Chinese manner, as a layer from the parent stock. The Chinese employ a very ingenious method for this purpose, which is particularly adapted to hot countries, where the vegetation is stronger than among us. The method is this; the branch intended for a layer, which is generally several inches thick, is wrapt in a straw band, in which horse dung is laid, and which is five or six times as thick as the branch. A circular incision, down to the wood, is made below the band, and water is made to fall upon it, from a considerable height, through a vessel with very small holes, generally a cocoa-nut shell, The branch soon puts forth filaments, and in a short time has such a strong bunch of roots, that in about two months, the wood may be sawed through, and the young tree planted in the ground, when it immediately begins to blossom, and bears, as a separate individual, the fruits which it promised as a branch. The Chinese also show knowledge which corresponds with our notions of the growth of trees in this particular, that in order to procure plants that will sooner come to maturity, they prefer the upper and thinner branches, but to have better and more productive layers, they choose the stronger branches, nearer to the ground.

The physiognomy of the Chinese colonists was particularly interesting to us, and was in the sequel still more so, because we thought we could perceive in them the fundamental lines, which are remarked in the Indians. The figure of the Chinese is, indeed, rather more slender, the forehead broader, the lips thinner and more alike, and the features in general more delicate and mild than those of the American who lives in woods; yet the small, not oblong, but roundish, angular, rather pointed head, the broad crown, the prominent sinus frontales, the low forehead, the pointed and projecting cheekbones, the oblique position of the small narrow eyes, the blunt, proportionably small, broad, flat nose, the thinness of the hair on the chin and the other parts of the body, the long smooth black hair of the head, the yellowish or bright reddish tint of the skin, are all characteristics common to the physiognomy of both races. The mistrustful, cunning, and, as it is said, often thievish character, and the expression of a mean way of thinking, and mechanical disposition, appear, in both, in the same manner. In comparing the Mongol physiognomy with the American, the observer has opportunity enough to find traces of the series of developments through which the Eastern Asiatic had to pass, under the influence of the climate, in order, at length, to be transformed into an American. In these anthropological investigations, we arrive at the remarkable result, that certain characteristics, which constitute the principal difference of the races, do not easily pass into others, whereas those which depend only upon *more* or *less*, gradually vanish or degenerate, through a series of different gradations. In this respect the difference of the negroes is peculiarly striking, who, in various particulars, especially the complexion, the hair, the conformation of the skull, the proportions of the countenance, and of the whole body, differ more from all other races than from each other. The negro races of the South Sea, and the Indian Archipelago, who, for the most part, are derived from a mixture of various races, who, at so great a distance from their native country, must experience considerable modification of the Ethiopic character, yet still indicate, in every respect, their African descent, rather than a nearer affinity with the other races. On the other hand, the physiognomical characteristics of the Mongol, Caucasian, Malay, and American races, blend with each other through so many shades, that we are involuntarily led to presume a common fundamental type for all these, in opposition to the Ethiopic, which perhaps is most strikingly marked in the Mongol, and to which the abovementioned various conformations must perhaps be referred as so many forms of development occasioned by climate, as has been already asserted by a very distinguished writer on Universal History. Whether such a change, proceeding from the aboriginal inhabitants of Upper Asia, has really produced the actually existing four chief varieties of the Mongol as the oldest, then the American, the Malay, and Caucasian, would be one of the most important and interesting investigations for the study of anthropology, as well as the history of the revolutions of the earth in general.

Lieutenant-colonel Feldner had been already several months at Santa Cruz, to direct the manufactory of charcoal, which had been established there for his majesty's account, and particularly for the use of the court at Rio de Janeiro. Though he was on a royal estate, and employed in his majesty's service, he was obliged to content himself with a miserable clay hut, and with scanty fare. We willingly shared both with our worthy friend; our conversation about our native country, and many agreeable recollections, made us forget every privation. We roamed, in his company, about the environs of Santa Cruz, consisting chiefly of marshy pasture land, interrupted by single low spots of wood, where we saw, for the first time, the long-legged stork (*Jaburú*) stalking about in great numbers. The lapwing (*Vanellus cayennensis*) hovered over our heads with uniform note, and spur-winged water-hens (*Parra Jacana*) ran about in flocks. We were not permitted to go in chase of them, as this is prohibited within a league from Santa Cruz. On another opportunity, we extended our excursion to Sabati, where we found an ophisaurus almost a foot and a half long, on the sandy downs, and between the hairy mimosa bushes. There are in this neighbourhood many soap trees (*Sapindus Saponaria*), the fruit of which is brought to the city in large quantities. The poorer class use them instead of soap; the finer, which is mostly imported from North America, is one of the expensive articles of housekeeping. In many years, one of these trees, which are generally about the size of our nut trees, produces several bushels of this fruit, which contains a great quantity of saponaceous matter. There are here many species of still higher trees, which are used, for burning into charcoal. These manufactories are managed in exactly the same manner as in Europe, principally in the driest months from July to September, and are very profitable on account of the scarcity of firewood for the use of the city. They now begin to be carried on with activity, since Mr. Feldner has proved, by examining the coal mines near Bahia, that very little is to be expected from them.

From our want of experience in the mode of travelling in this country, we had taken with us from Rio much superfluous baggage, and now found it necessary to lighten the burden of our mules. Having accordingly selected whatever could be dispensed with, and left behind, we set out from Santa Cruz on the 11th of December, and were accompanied part of the way by our friend. A very good road leads S.W., almost in a straight line, to a bridge, where a barrier was erected to examine travellers in the interior of the provinces of Rio and S. Paulo, but particularly to prevent a contraband trade with gold dust, from the interior to the coast. The country is an open level, watered by numerous pools and streams, and is bounded to the south and west by the Serra do Mar, which runs along the sea-coast at different distances, and here sends out a branch nearly in a direction from west to east, which, under the name of Serra da Ilha Grande, extends to the bay of

Angra dos Reys, and the prolongation of which forms the nucleus of Ilha Grande.

We passed the night of the 12th of December at Taguahy *, a large sugar manufactory, the environs of which are adorned with an incredible variety of vegetation. A small church upon the eminence, commands the valley. Not far from it there is a large lake, which is frequented by water-fowl of manifold species. We here observed, for the first time, a kind of woodpecker (*Picus garrulus*, nob.), which is found only in districts, resembling the campos, and precedes the traveller with a loud screaming cry. On the following morning, when we had our mules loaded, we had another unhappy proof of the difficulty of conveyance in this country. A mule which had to carry the tin cylinder, containing the barometer tubes, suddenly became shy, run into the neighbouring wood, and could not be retaken till it had thrown off its load and broken all the instruments. This loss was the more distressing to us, as it could not be repaired during the whole journey till we reached S. Paulo, whither we had luckily sent some barometer tubes by water. The natural sciences have hitherto met with little encouragement, even in the principal cities of Brazil, the barometers and other instruments which are here and there met with are, accordingly, considered as invaluable by the few persons who amuse themselves with meteorological observations.

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* Taguahy derives its name from the Brazilian words *Tauà*, yellow, and *Hy*, water. In the southern provinces, it is observable among the many modifications of the Lingua geral, that the numerous vowels are divided by the insertions of consonants between them. Thus Taguâ is made out of Taua; Jaguaretê out of Jauaretê, the ounce, &c.

At the foot of the mountain which we had now to ascend, was the house of a Dutch planter. While a person went into the wood to look for him, and our caravan went forward, we had an opportunity of collecting an abundance of plants, and of the most beautiful insects, particularly the cetonia. This planter, whose name was Dufles, cultivates the sugar-cane and coffee with great success, in which he is much favoured by the moisture of the valley, and the sunny situation of the mountain. Fortunately, we did not stay here very long, and soon overtook our mules, which we found in great confusion on the clayey soil, which was full of deep holes. Most of them had thrown off their burdens, or stuck fast in the pits. We were therefore obliged to make fascines, to fill up the holes, and to give the animals a firm footing. After excessive exertions, we at length reached the summit of the mountain, where a fine view over the plains of Santa Cruz made us forget our labours. With various feelings, we here took our last farewell of the sea-coast, and bent our way into the interior. The mountain consists of granite of a pretty fine grain, and reddish colour, which sometimes passes into gneiss, and is covered with a thick forest. The steep road turns in the mountains from south to west, and leads through several agreeably watered valleys, but lonesome and gloomy from want of cultivation, to a miserable village in the midst of the mountains, which might afford a very attractive residence for a naturalist, because its environs have an endless variety of beautiful vegetation, and interesting animals. Myrtles, rubiaceæ, scitamineæ, and orchideæ, constitute the principal feature in the physiognomy of these woods, which, like those of the Serra de Estrella, are at an elevation of 2500, to 3000 feet above the level of the sea. Before we reached the Fazenda S. Rosa, where we intended to rest for the night, we passed a royal farm, which is a dependency of that at Santa Cruz, and is chiefly employed for the purposes of felling fine wood (*Madeiras reaës* or *de ley*), which work is performed by the king's slaves. The progress of the journey became more and more inconvenient and dangerous, on account of the steepness of the mountain, the frequent hills and clay pits, which obliged us to make a considerable circuit. The narrow valleys, covered with thick forests, contract on all sides, and a cool and clear brook sometimes flows through them. Profound solitude reigned here, and, with the exception of a few wretched clay huts, or spots lately cleared of the wood, the traveller meets with nothing which reminds him of the influence of man on these majestic scenes of savage nature. As we descended from the steep eminence, and issued from the dark gloom of the forest, we perceived the little hamlet, Villa de S. Joâo Marcos, and afterwards a solitary but handsome fazenda in the valley. The newly cleared grounds are soon covered, especially on eminences exposed to the sun, with an incredibly thick vesture of a kind of brake (*Pteris caudata*), which, by spreading its tough roots in the ground, becomes a very troublesome weed, and very difficult to be extirpated. The inclination of this plant always to grow upon land that has just been made fit for tillage, is worthy of attention in the history of the diffusion of plants. In the latitude through which we now travelled, we observed several other plants grow immediately after the clearing away of the wood: among these were *Phytolacca decandra* and *icosandra*, *Scoparia dulcis*, *Solanum decurrens*, and some species of the same genus, *Gronovia scandens*, *Phlomis officinalis*, nob., and several kinds of hyptis. In North America, the thick plantations of ferns are used to make potashes, because they contain so much alkali; but, in Brazil, no attempt has yet been made to employ, for this purpose, the ferns, and those immense quantities of wood yearly felled; because they consider the ashes left after burning the wood, as necessary to manure the soil.

At Retiro, a miserable fazenda, lying sideways from S. Marcos, in a narrow swampy valley, surrounded by woody mountains, we passed the first night in the open air. The uraponga had ceased his strangely sounding notes, the swarms of grasshoppers commenced, as night set in, their monotonous chirp, at intervals interrupted by the notes of a large frog, resembling a drum, the lament of the capueira, and the dull cry of the goat-sucker. Affected by the constantly returning impressions, we felt ourselves in a strange and solemn mood in the lonely wilderness, which was farther increased when the firmament, with all the splendour of the southern constellations, beamed on the dark forest, and millions of shining beetles fluttered in luminous circles through the hedges, till at length a heavy rain veiled all in darkness. The woody ridge of mountains through which we had hitherto travelled is the highest part of that branch of the Serra do Mar, which, in general about three thousand feet high, runs towards the sea-coast from the principal chain, which runs to the north. The next mountains over which we passed are lower, and rise at longer intervals. The road is sometimes cut very deep in the soil, which consists of red clay, is very narrow, and when two troops of mules meet, as it often happens, dangerous. This kind of road is, however, welcome in luxuriant forests, because the confining all travellers to one narrow path, prevents it from being quickly overgrown, as would otherwise happen. Paved roads and bridges are, of course, to be found nowhere in these solitudes, though the ground in the neighbourhood of the numerous streams, is quite swampy, especially in the rainy season. We first observed in these woods the notes of a greyish brown bird, probably a thrush, which frequents the bushes and ground in damp low woods, and sings with numerous repetitions through the musical scale, from H^1 to A^2 (of the German scale), so regularly, that not a single note is wanting. It commonly sings each note four or five times over, and then proceeds imperceptibly to the following quarter tone. It is usual to deny to the songsters of the American forests all melody and expression, and to allow them no pre-eminence but splendour of plumage. But if in general the pretty natives of the torrid zone are more distinguished by the beauty of their colours, than by fulness and power of note, and seem inferior to our nightingale in clearness and melodiousness of tone, yet this little bird, among others, is a proof that they are at least not destitute of the principles of melody. How far the musical improvement of man has already had an influence on the notes of birds, remains an interesting subject for physiological investigation. It is at least conceivable that when the almost inarticulate tones of a degenerate race of men, no longer resounds in the woods of Brazil, many of the feathered songsters will also produce more refined melodies. Besides the birds of the forest, the attention of the zoologist is claimed by the serpents, particularly the beautifully coloured ahaetulla, which is seen darting across the road, or killed by the passing caravan. A lichen *, which by its splendid rose-colour is a real ornament to the stems, grows here on trees, especially in moist places. The beauty and the peculiar brilliancy of this plant, have induced Mr. Tonay to use it for dying; and Vauquelin †, who examined it by the name of *cochenille végétale*, observes that the red colour contained in it, has much resemblance with the orseille (*dyers' lichen*), is less lively and brilliant, and in smaller quantity, but may be advantageously employed in dying silk and wool, but not so well for cotton. In the main valley, between the ranges of mountains we had already passed, and the following, flows the Pirahy (Fish River), the water of which is pretty clear, though its bed is sandy and marshy. As there is neither a bridge nor ferry, the mules had to be unloaded, and swim through, and the luggage carried over on the shoulders of our people. In the deepest place, a narrow plank (*pinguéla*) had formerly been laid for foot passengers; but it had been unfortunately carried away by the water, so that Mr. Ender, crossing over on horseback, got entangled, to our terror, in a deep hole, from which he did not extricate himself without great danger.

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* Spiloma roseum, Raddi. (Mem. di Fis. Soc. Ital. vol. xviii. p. 349. t. 2.)

† Mémoires du Muséum, Année 3me, p. 145.

At the Fazenda dos Negros, four leagues from Retiro, we met with an unpleasant accident, one of our people being bitten by a bird-spider. Though these animals are universally proscribed as poisonous, yet the wound, after having been burnt over hot coals, was not attended with serious consequences. The numerous slaves of the fazenda were celebrating a festival, which continued from sunset till late in the night, with dancing, singing, and noisy music. The din of their atabaque, a kind of drum, and the canza, a thick tube with iron bars across, on which they produce a jarring sound, by passing over it backwards and forwards with a stick, disturbed us as much as the torrents of rain, which, driven by the high wind from all quarters under our shed, frequently obliged us suddenly to lie down in another place. With this night we began to experience the inconveniences of a journey during the season of the rains, which henceforward continued uninterruptedly not only in the night, but even in the afternoon. Surrounded by wooded mountains, which were covered every morning low down with thick fog, we soon perceived a considerable increase in the moisture of the atmosphere. The whalebone hygrometer, which in the preceding months had been more elastic, was now very often 60° and 65°, and in the evening and morning more than 70°. The wet season that now set in appeared to be welcome to the inhabitants themselves; for the places where the woods had been burnt during the late dry months, were now used for the new plantations. We, on the contrary, were of course greatly incommoded by the rain, which came down all night in streams, or in fine mist, and by the cold which accompanied it. Our baggage suffered considerably by the sudden increase of damp, and among our collections, the insects and plants in particular, were covered with a yellowish mould *, the formation of which no care can prevent. We hoped, indeed, that after crossing the second chain of mountains which stretches from N.W. to S.E. towards the sea, we should find a more favourable climate ; but in this we were deceived, for we had continued rainy weather for several weeks. The roads, which are mostly heavy clayey soil, became nearly impassable, and the swelling of the rapid torrents, through which the drivers had often to carry the baggage on their backs, greatly delayed our progress.

This second chain of mountains, from the most northern valleys of which two of the chief sources of the Paraiba, namely, the Paratininga and the smaller Rio Turbo, flow, consists, like the first, entirely of granite, which, here and there adopting a scaly structure, passes into gneiss.

In several places of the Freguezia of Bananal, which leans on a hill, the mountain masses showed

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* It was the same *Eurotium herbariorum* Link, which, among us also, makes its appearance in our herbals in damp weather.

a direction in hours 3 and 4 of the miner's compass, and an inclination of about 30°. The granite consists here of much grey and silvery mica, white quartz, and white or reddish felspar. These parts, though only thinly peopled, seem to be more diligently cultivated than all those through which we had hitherto travelled. We saw here and there very extensive plantations of maize, the most important production in these mountains, which here yields from fifty to sixty fold. Several European colonists have attempted, in the colder regions of these mountains, to grow flax, which has been attended with great success; but it is not probable that this plant will be very extensively cultivated, considering the abundance of cotton, and the little demand for linens, which at present are not much used by the Brazilians. On a considerable eminence behind Bananal we observed an evident transition of the gneiss into mica slate, which has its direction in hour 3. We found on the road casual fragments of a compact brown iron-stone, which passes into drused hematite. To the south of Bananal, several other chains of mountains, which are almost parallel to each other, and all thickly wooded, run from the west towards the ocean. We passed, in two days' journey, the first of these, the outlines of which are more rounded, and of more agreeable form, having between them some light valleys, with pools and rich meadows. We everywhere observed the same species of rock, namely, a pretty coarse-grained granite, with much grey and silvery mica. Several colonists have settled in the valleys by the side of small streams, and their extensive plantations of Turkish wheat give the first appearance of culture to those lonely tracts. The third mountain ridge, Morro Formoza, resembles by its bolder forms, larger and irregular masses, the mountains round about Rio, and constitutes the frontier of the provinces of Rio and S. Paulo. Along the road, which runs south-westward through the mountains with many windings, there is exposed in many places granite, with large foliated very ferruginous mica, and in it small veins of disintegrated red iron-stone, the direction of which is in hour 2 of the miner's compass, in very considerable angles of inclination; likewise very large pieces of compact brown iron ore, and large masses of hard white quartz occur here and there. From the Morro Formoza, which forms the limit of the territory, and divides the rivers in this eastern branch of the Serra do Mar, the road gradually declines through low mountains, which are more open and agreeable, and where population and culture increase. The richness of the scenery indemnified us for the fatigues which the bad roads and the frequent showers of rain occasioned; in particular, these parts seemed to be the resort of the most beautiful butterflies, which, with their gay shining wings, sported by thousands about the mountain streams illumined by the sun.

On the third day, after we had left Bananal, and passed the river, and the little place Barreiro, we reached S. Anna das Arêas, a pretty considerable town, which had lately been raised by the king to the rank of a villa. The government endeavours, in general, to favour the union of several colonists by conferring such titles and the privileges connected with them; in which it is actuated by the double principle, that by living closer together the colonists gain in civilisation, and regard for their duties as citizens; and the state, by the increased facility in the administration, the collection of the taxes, and the regulation of the militia. In every country which, with a great extent, possesses but a small population, it is certainly more to the interest of the government to improve some parts by augmenting the population, and encouraging industry, and raising them to the necessary degree of social and civil relations, than to suffer the mass of inhabitants to scatter themselves over the whole face of the country, and allow each individual to lead a life, which, being remote from all protection and all observance of the laws, without the beneficent influence of society, cannot promote morality, the social virtues, nor cultivation. The tendency of the measures of the Portuguese government has, in this respect, a resemblance to the system of military colonisation in Russia, though the latter, as a warlike establishment, has an entirely different object. The Villa das Arêas, which has arisen within these five and thirty years in this thickly wooded mountain, out of the settlement of a few poor colonists, cannot, of course, yet present a picture of high prosperity. The low houses, built of slight laths, simply interwoven with twigs, and plastered with clay, and the little church which is constructed in the same manner, seem very ephemeral; so that these dwellings appear to be erected merely as temporary places of refuge for wanderers. We entirely miss the appearance of comfort and of solidity, calculated for long duration, which distinguishes European dwellings, though it must be owned that this is not entirely unsuitable to a climate, in which the inhabitants, whose settlement is so unfixed, are so little in need of a durable abode. We found by far the greater part of all the towns in the interior of Brazil like this place, and the rarity of a well-built and comfortable house frequently excited regret for the conveniences and cleanliness of our native land. In the neighbourhood of Arêas, there is still a considerable village of Indians, who are the remains of the numerous tribes which, previously to the occupation of the Serra do Mar by the Paulistas, inhabited the whole of the extensive forests of this chain, and are now either extinct, or mixed with negroes and mulattoes, live in a state of half civilisation among the colonists. They are still distinguished by the indolence, and the almost untameable obstinacy of their forefathers, and have but little intercourse with the colonists, whose plantations and cattle frequently suffer from the predatory attacks of these troublesome neighbours. The inhabitants call these Indians by the name of Capoculos, thereby distinguishing them from those who are wholly savage and uncivilised (*Gentios*, *Bugres*, *Indios bravos*). It is probable that these remaining Indians, who dwell along the coast, belong to several tribes whose names are partly lost, because the Portuguese did not distinguish them from each other, but bestowed on them the common name of Coroados or Shorn, because they used to cut off the hair from the middle of the crown, and wore only a circle of hair round the forehead.* The chief abode of the Coroados, is at present on the banks of the Rio da Pomba, a side branch of the Paraiba; and as the Indians generally make their migrations along the rivers, it seems that they originally spread from the interior to the sea. Those who live together in the Aldea de Valença, not far from the road of Rio to Villa Rica, between the rivers Paraiba and Rio Preto, are remains of the same nation. This place was but a few years ago, the only one in the province of Rio de Janeiro, in which a considerable number, both of converted and unconverted Indians resided. The situation of the establishment, favoured the inclination of these children of nature, to return from time to time to the great primeval forests on the Paraiba, and farther northward, towards Minas Geraës, whence they, however, always returned to the ecclesiastics of the mission. The introduction of a Swiss colony into Rio de Janeiro, which took place soon after we left that city, and the command of the government that those Indians should clear the forests for the new comers, is stated to be the cause that a great part of them have lately for ever abandoned the village.

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* Historians mention in the neighbourhood of Rio de Janeiro, and along the coasts of that place, southward to S. Paulo, the Tamoyòs, a very warlike nation, allied with the French under Villegagnon against the Portuguese; also the Carijos or Guaràs, in the forests of the whole Serra do Mar, also extended very far to the south. On the north coast of the Bay of Rio, and in the plains of Cabo Frio, dwelt the Goytacazes; of the latter, the Corografia Brasilica (II. p. 45.) mentions three hordes, namely, the Goytaca-Guassú, Goytaca-Moppis, and the Goytaca-Jacoretò. Westward of these, and to the south, behind Serra do Mar, nearly as far as to S. Paulo, was the abode of the Goyanazes, who bore an affinity to the Goytacazes.

The capitâo môr in Arêas, delighted at the appearance of several strangers of the nation of his crown-princess, and from such a remote country, offered us, in a very friendly manner, when we passed through, his services in forwarding our effects; because his experienced eye soon discovered the bad condition of our mules, which, by the neglect of our unskilful Arieiro, had become almost unserviceable; but as the latter assured us that we did not want the assistance of strangers; and that the mules, though a little galled by the saddles, were in perfectly good condition, we continued our journey. The road leads constantly southward, through several narrow valleys, thickly covered with wood, which are intersected by some rivulets, flowing southward to the Paraiba. The mountain consists of a gneiss, in part much decomposed, upon which there are beds of slaty clay iron-stone, which is in strata, and the direction of which is in hours 3 and 4 of the miner's compass. From the highest point of the mountain, we saw behind us three parallel chains, piled up in immense steps, but before us only the lower Serra do Paraiba At sunset we had descended from the high mountain, and reached some poor huts in the deep bottom of the valley of Tacasava, near a rapid stream, which runs into the Paraiba. Several caravans had already encamped here, who were conveying fowls to Rio for sale. The disproportion of the wants of a great city, and the scanty produce of the environs, which are for the most part still uncultivated, makes it necessary to bring supplies from very remote districts. The industrious Paulistas, therefore, carry their live stock from a distance of about a hundred leagues, to the market at Rio, where they dispose of them to great advantage. The neighbourhood of these feathered travellers, caused us this time a sleepless night. We observed, on this occasion, that the note of these fowls, which are of European origin, is a simple, harsh, or shrill tone, which gradually becomes weaker and lower, is rougher and more disagreeable than ours. These fowls are confined in large baskets, made of the pliant stalks and shoots of several kinds of paullinia, and the troughs for them are made of thick stems (*Taguara*) of arborescent grasses (*Bambusa*).

On the following morning, when we were going from Tacasava, we found that the capitâo môr of Arêas had but too justly appreciated the bad condition of our mules. The animals had been so much galled by the saddles, which our unskilful Arieiro did not know how to fit on them, that they were now incapable of any other service, and compelled us to halt. The swelling which the animals get from the roughness of the saddle, or the unequal balance of the burden, is often so malignant that it mortifies and occasions death; the greatest care was therefore necessary not to run the risk of losing the whole troop. The leader, it is true, laid the whole blame on the thick fogs during the night, the heavy morning dew, and, above all, on the light of the moon, which made the animals' wounds worse; for these are the principal elements in the theory of diseases of the common people: but we would not leave the cure, as he proposed, to the beams of the sun, and so the day was spent in the disagreeable veterinary occupation of burning, scarifying, washing the wounds with a decoction of tobacco, and bleeding; in which the Arieiros of the other troops that were halting at the same place goodnaturedly afforded their advice and assistance. In the morning the thermometer stood at 15° in the shade; at noon at 28°, and in the neighbouring river at 20° R. In the evening we saw a magnificent convoy pass by. It was a caravan of the bishop of New Cordova, who, being driven from his residence by the political revolutions in the Spanish colonies, was travelling with a Portuguese escort from Monte-Video to Rio de Janeiro, where he intended to embark on his return to Europe. He had been already four months upon the road to traverse 11° of latitude. By sea he might have returned to Europe in less time. It was not till the evening of the following day that we received fresh mules, which the obliging capitâo môr of Arêas sent after us. We now resolved, in order to redeem the time we had lost, immediately to continue our journey by moonlight, which, however, we soon had reason to repent. We were still in the village when one of the new animals threw off his load in the middle of a stream and ran off, which occasioned another and still more disagreeable delay. With much difficulty we gathered the scattered parts of the botanical collections. At last we recovered every thing but a bottle of flowers preserved in spirits of wine; but even this was afterwards found by the owner of the venda, delivered to our friend Mr. Ender, on his return from S. Paulo to Rio, and through him arrived safe at Munich. We mention this little circumstance with pleasure, as a proof of that good fortune which attended all our collections of natural history, which, though exposed to innumerable hazards and dangers, have all, without exception, reached their final destination; a success which few travellers can boast. Travelling by night in the tropical countries is extremely agreeable, especially from the coolness which refreshes the traveller after the parching heat of the day. The landscape, too, appears in new and often striking forms, which excite in a peculiar manner the fancy of the European, by the uncertainty of their outlines. Only, travelling by night is not good for the animals, because they prefer resting from midnight till the morning. During the last few days we had descended lower and lower out of the narrow valleys of the mountains, and now sometimes saw in the moonlight, to the right, before, and on the side of us, the summits of a part of the Serra Mantiqueira, which runs from Minas southward, behind the Serra do Mar. Their bluish outlines formed a magic back-ground to the landscape, in which wood and open spots alternated. The lofty trees of the forests through which we passed were veiled in black shadow, and many strange and never before heard nightly voices resounded; all united to excite in us sensations equally singular and uncommon. The conduct of the troop by night requires double attention in the driver, that none of the animals may conceal itself in the bushes and remain behind. Our attendants, lively Paulistas, did not fail to encourage each other by calling and singing; they joked on the possibility of some venomous serpent lying in the road, till the oldest of them, with an air of importance, assured them that this was impossible; because he kept all dangerous vermin at a distance by a daily prayer to St. Thomas. The chance of meeting with poisonous serpents, which come out to look for prey during the night, and prefer the lighter road to the bushes, is certainly no inconsiderable danger for those who travel during the night, more especially where the little schiraraca (*Bothrops leucurus*, nob.) is very common. A few days before, while resting on a hollow tree, during the noonday heat, we had lain upon one of these venomous serpents; fortunately it was caught in time, and put into spirits of wine. At Malada, consisting of a few poor huts, we asked in vain for a night's lodging, for the common people in Brazil do not sit up late at night, except on occasion of their festivals (*funçoës*). At Silveira, two leagues from Tacasava, a similar halting-place for caravans, we at last met with a fenced-in feeding place (*pasto feixado*) for the cattle, and a roomy rancho, in which we hung up our hammocks.

We were, it is true, still among the mountains, but the rounder summits are more detached; and as, instead of the gloomy forest, they are covered with cheerful plantations of maize, mandiocca, and sugar-cane in more extensive spots, make an agreeable impression on the traveller, who involuntarily feels himself constrained and oppressed by the silent uniformity of the woods. We accordingly breathed more freely when, on the following day, still proceeding in the direction to south-west, we at length reached the last summit of this chain, which belongs to the Serra do Mar, and a deep and pleasant valley extended before us. This valley is bounded to the west, at the distance of about two miles, by a part of the Serra do Mantiqueira, the general direction of which, at this point, is from S.W. to N.E. From thence it appears like a long uninterrupted ridge, without steep declivities and ravines, but marked by agreeably picturesque outlines, with many gently rising eminences, some of which are covered with thick wood, and others with green pastures. The valley itself, which we at length entered, after having passed the huts of Pajol and the river Iripariba, which falls into the Paraiba, extends between the last extremities of the Serra do Mar and those of the Mantiqueira above mentioned, to the south; the Paraiba, after issuing from the narrow valleys of the first chain of mountains, flows in it towards the north, and takes at Jacarehy a direction quite contrary to that which it had before; its banks are partly covered with low wood and partly with rich pastures.

About noon we passed a place where a side road branches out, which leads to Minas, and is hence called Mineiro, and reached, at last, Lorena, otherwise called Guaypacaré, a village consisting of about forty houses, and of no importance, notwithstanding its fertile environs, and the great intercourse between the provinces of S. Paulo and Minas Geraës. The road from S. Paulo to Minas passes here in two points, called Porto da Caxoeira and Porto do Meyra, across the Paraiba, which flows half a quarter of a league from the villa. The chief articles of trade from S. Paulo to Minas are mules, horses, salt, dry meat, iron goods, and all other manufactures which go from the coast to the interior. At present, however, Minas is almost entirely supplied by Rio and Bahia, and the importation from Santos is inconsiderable; and of still less importance is that from Angra dos Reyes and Parati, in the province of Rio de Janeiro, which are the nearest to the entrance of Minas. Minas sends principally coarse cotton goods to S. Paulo. As we proceeded farther into the fertile valley, to the south of Lorena, which was magically illumined by the setting sun, we observed remarkable changes in the vegetation. The savage character of the forests disappeared, and the open, unconfined, mild nature of the plains (*campos*) was gradually more apparent the farther we advanced. Instead of the thick and high mountain woods, we had now before us plains and gently rising hills, which are covered with scattered bushes and extensive tracts of verdure. The singularly formed brown flowers of the Jarinha (*Aristolochia ringens*) and a white Ipomœa (*Ipomœa Krusensternii*, Ledeb.), two gigantic flowers, climb over the hedges, which consist of several splendid specimens of the family of melastroma, myrtles, and euphorbia. The *Ambrosia artemisiæfolia*, a strand plant of Virginia and Carolina, is found in several thick bushes on the shores of the Paraiba. The plain, though partly very swampy, is one of the most fruitful districts of S. Paulo. Tobacco thrives particularly well, and the cultivation of it is the chief occupation of the inhabitants of Lorena and of the village of Guaratinguetá, two leagues distant, where we passed the night. As the moisture and warmth are favourable to the separation of each specific substance on the leaves of the tobacco, on which their goodness chiefly depends, the tobacco cultivated along the sea-coast, and in the warmer valley of the Paraiba, known by the name of tobacco da marinha, is preferred to the more indifferent sorts of the mountain tobacco, which is called tobacco da serra acima. But the tobacco of the island of Saint Sesbastiâo is preferred in the country to all others, and is likewise exported from the province as snuff. The mode of treating the leaves, which are gathered several times in the year, is very simple. After they have been dried in the air they are laid together in bundles, or twisted in large rolls, which are one of the most important articles of barter employed by the Guinea ships in the slave-trade.

Guaratinguetá is situated in an extensive savannah near the river Paraiba, opposite some projections of the Serra do Mantiqueira, on a pleasant hill, surrounded with banana and orange trees. The Indian name of the village gives a favourable specimen of the talent for observation possessed by the aboriginal inhabitants; for this long word signifies the place where the sun turns back. In fact, the tropic of Capricorn is scarcely a degree south of the villa, which pleases by its simple and cheerful appearance and some traces of a superior mode of life. Since our departure from Rio this was the first place where we saw any glass windows, which in Brazil, always indicate prosperity, and, in the interior, even luxury. On the other hand, the traveller is surprised at the want of all regularity and order in the exercise of trades. Here, as almost everywhere in the interior except the more populous places, very few trades are exercised by guilds and corporations. On the other hand, it cannot be said that the trades are free, for the trades themselves are for the most part wanting. Only the rich land-holders are able to give due employment to mechanics, and the poor man supplies all wants of this kind by his own ability. The former generally have, among their own slaves, all those mechanics who are necessary for domestic purposes. An obvious consequence of this is that the public superintendence over trades by the police is rendered more difficult. We, therefore, could not be surprised, that in a place containing some thousand inhabitants we were obliged to be content with a frugal meal on an armadillo* which we had shot by the way. The flesh of this animal has, indeed, an agreeable taste, resembling fowl, but is very fat.

The road goes from the villa, always south-west, through the valley of the Paraiba. To the left of us lay a pleasant well-cultivated chain of hills planted with beans, maize, mandiocca roots, and tobacco. On the right, the broad valley extends to the chain of Serra do Mantiqueira, and bearing scarcely any traces of culture, is covered with thick low bushes of myrtles, cujawas, &c. a dreary and desolate prospect. Only the hope that thousands of happy people will one day inhabit this highly gifted country can cheer the mind of the traveller. After proceeding a mile we reached the shrine of Nossa Senhora Apparecida, a chapel situated on an eminence, with a few houses about it. We had brought letters from Rio for the capitâo môr of Guarantinguetá, who resides here. He received us with visible pleasure, and treated us with everything that his house afforded. The cordial reception offered to a stranger, the busy haste with which all the inmates of the house are eager to wait upon him, excite an agreeable sensation in the mind of the European traveller. Accustomed, in foreign countries, to purchase everything which is not offered gratis, he fancies himself transported to the patriarchal customs of oriental antiquity, when the name of a guest gave, as it were, a legal claim to such a kind welcome, and was more than an apology for the disturbance which it caused in the family. The first thing shown us here was the chapel. It was erected about seventy years ago, a long period in this country; it is partly built of stone, and adorned with gilding, bad paintings in fresco, and some in oil. The wonder-working image of the Virgin attracts many pilgrims from the whole province, and from Minas. We met many of these pilgrims when we proceeded on our journey on Christmas-eve. Every body here, women as well as men, travels on mules or on horseback; frequently the man takes the woman behind him on the same saddle. The dress of these planters is quite adapted to their local situation: a brown beaver hat with a very broad brim, which serves, at the same time, as a protection against the sun and the rain; a long very wide blue frock (*poncho*), with a hole at the top for the head; jacket and trowsers, of dark calico; high unblacked boots, fastened below the knee with a leathern strap and buckle; a long knife with a silver handle, which serves as a defence, and sticks either in the boot at the knee, or in the girdle, and is used at meals as well as on other occasions, are the chief characteristics of a travelling Paulista. The women wear long wide surtouts of cloth, and round hats. All those that passed us upon mules showed themselves to be admirable riders, especially in the speed with which they endeavoured to avoid the thunder-storms which threatened them on all sides. Our slowly moving train, on the contrary, was obliged to suffer three heavy showers to pass over it, and came, just as it was getting dark, to a wretched shed with a venda, called *As Taibas*, where we could scarcely find room for our baggage, which was soaked through. It rained impetuously the whole night; and the frogs of the neighbouring marshes, being quite in their element, croaked in tiresome unison. Though the place was anything but agreeable, yet, as it secured us from the fury of the elements, we soon became cheerful and in good spirits. Recalling pleasing recollections, we compared the sufferings of this Christmas-eve in Brazil, with the pleasures with which it is usually accompanied in civilised Europe, and even contrived to see them in an agreeable light.

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* Tatú, Dasypus septemcinctus.

Between Nossa Senhora Apparecida and As Taibas large blocks of a pretty fine-grained red granite, resembling that on Serra do Mar, stand out. They are considerably rounded off by attrition, and put us in mind of the masses of rock which are found here and there in the north of Germany, in the valley of the Po in Italy, between the principal chain of the Alps and Mount Jura in Switzerland, &c. It is probable that a great part of the valley, through which the Paraiba now flows, was connected with the sea, and that these rocks derived their present form and situation from violent overflowings and currents of that element. There are, besides, many traces in the valley of the Paraiba that it has often changed its bed.

On Christmas-day we continued our journey in the direction from S. S. W. to Pendamhongaba, five leagues from Guarantinguetá. The three streams of Parapitinga, Agoa Preta, and Ribeirâo da Villa, were so much swelled, that our collections ran great risk in the passage over them. The rain continued without ceasing to pour down in torrents; and the whole valley was almost always enveloped in thick fog. We had, therefore, neither inclination nor opportunity accurately to examine this woody and well-watered district. Travelling in tropical countries during the rainy season, besides many other inconveniences and dangers, has the double vexation, that the traveller finds great difficulty in observing the environs; and his books, instruments, and collections, can hardly be preserved from spoiling, by the greatest care and attention. Pendamhongaba consists of some rows of low huts lying scattered upon a hill, and does not appear to be in a thriving condition. The capitâo môr of the place received with great politeness his guests, who were wet through, and afterwards invited us to view the church, which is only half finished, and loaded with tasteless wooden ornaments. It was handsomely lighted up, and adorned with a manger, in which the infant Christ lay. There was something affecting in this emblematical custom in this place, because we dwelt with pleasure on the idea that the doctrine of salvation had found its way into these lonely, beautifully wild tracts. Since we had descended from the mountains into the valley, the physiognomy of the landscape had changed more and more, and the difference in its character became more independent and unmixed, the farther we removed from the dark primeval forests of the Serra do Mar. From this place the road lay in the broad valley of the Paraiba, over low hills, which, in the beginning, we found covered with all kinds of dwarf bushes and single trees; but farther on it became opener, and clothed with grasses and herbs, or with long rows of ananas. Herds of mules and horned cattle were grazing in these pleasant tracts. The Brazilian distinguishes the two principal forms in the physiognomy of the vegetable world, wood and plain, by the names of Matto and Campo; but they have many other names for the numerous varieties of the latter, which determine, more or less, the local character of the landscape. The greater part of the valley of the Paraiba is covered with pastures (*campos*), which descend from the eminences, and are but seldom broken by low woods. Though these meadows do not charm the eye with the fresh and pleasing verdure of our northern pastures, they astonish the observer by the gay variety and novelty of their vegetable forms. On the hard soil, generally a stiff red clay, mixed with fragments of quartz, there are detached rank bushes of greyish green hairy grasses, at greater or less intervals from each other: between them grow an infinitude of the prettiest herbaceous rubiaceæ, malpighia, apocyneæ, and compositæ, of the greatest variety of colour, and flowers of elegant forms.* In places where among these humble children of Flora a more luxuriant vegetation appears, there are single thick-barked trees†, which seldom rise above fifteen or twenty feet in height, have far-spreading crooked branches, dry pale-green leaves, and form a low, light grove, in which the form of each individual is easily distinguished. This latter kind of wood is called in Brazil, Tabuleiro, and when the trees grow so close together that their branches touch, Tabuleiro coperto. Besides the single trees, rich-flowering myrtles, creeping banisteria, bushy erythroxylon, several kinds of the well-tasted guava (*Psidium*), grow here and there in thick groves (*Carrasco, Feixado*), from among which a grotesque cactus now and then rises. This latter form, which is so peculiarly characteristic of America, is here less frequent than in the sultry deserts of Pernambuco, Ceará, and Caracas. Almost all the productions of the vegetable kingdom which we saw here were new to us; and our attention was constantly excited by these elegant forms of the campos, which strongly contrast with the massy and juicy natives of the forest, and rather resemble the delicate plants of the northern Alpine meadows.

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* Declieuxia satureoides, spergulæfolia, myricoides, œnanthoides, cordigera, mollis nob.; Hamelia, Rhexiæ et Melastomæ herbaceæ et Banisteria sp. plur.; Gaudichaudia tuberosa, triphylla, marginata; Croton fulvum, antisiphiliticum nob.; Wedelia longifolia, sessilifolia, cordifolia; Lippia bracteosa; Calystegia campestris; Bignonia micrantha; Cnemidostachys myrtilloides, herbacea (Tragia corniculata Vahl.); Echites campestris, velutina; Oxypetalum flavum, erectum; Bailleria graveolens; Vernonia grandiflora, rosmarinifolia nob.; Kleinia Porophyllum W.; Molina sessiliflora Vahl.; Bidens asperula; Eryngium Lingua Tucani; Celastrus cymosus; Hedera ternata; Hydrophylax valerianoides; Sauvagesia ovata; Clitoria angustifolia; Mimosa hirsutissima; Sweetia nitida nob.

† The most important trees of these campos are — Laplacea parviflora nob. (Pâo de S. Jozé). Gomphia, Malpighia, Spixia (Leandri), Ternstrœmia, Marcgrafia, Rapanea, Vochisia, Qualea, Salventia, Solanum, Byrsonima dasyantha, mycrophylla H., Erythroxylon havanense Jacq., Clethra tinifolia Sw., species of Clusia, Havettia, Panax, Melastoma, Rhexia, Myrtus, Psidium, Schinus, Annona, &c.

Taubaté, which we reached late in the evening, is situated on a flat hill, three miles to the S. E. of Pendamhongaba. The eminence commands a view of a great part of the plain, through which little groves and bushes are scattered. The Franciscan convent, on the left of the road, surrounded by some rows of majestic palms, makes a favourable impression, and excites in the traveller the hope of finding a considerable place. In fact, Taubaté, which consists of one long principal street, with huts built closely together on each side, and some by-streets, is one of the most important towns in the whole province. In age it rivals the capital. At the time when the thirst of gold incited a number of Paulistas to undertake dangerous and adventurous excursions through Minas and Goyaz, the inhabitants of Taubaté distinguished themselves.* On this account a government establishment for refining gold was founded here. The inhabitants of Taubaté (*Taubaténos*), however, were thereby engaged in violent competition and implacable feud with the neighbouring Paulistas (*Piratininganos*), so that whenever the two parties met in their excursions sanguinary contests always ensued. This enmity is said still to continue in silence, though the inhabitants of Taubaté have now entirely renounced the occupation of gold-washing in other provinces, and follow agriculture and breeding of cattle in their own country, which is quite destitute of that precious metal. The women manufacture mats out of a large aristida and other species of grass growing in the neighbourhood, which are sent to Rio for sale.

We halted one day at Taubaté, in order to dry our effects, which were quite soaked through. The house, which an inhabitant of the village shared with us, was but ill calculated to afford us comfortable shelter. The houses in general are seldom above one story high; the walls are almost in all cases of thin rafters or laths, interwoven with twigs, plastered with loam, and covered with a white clay (*tabatinga*), which is found here and there on the banks of the rivers; the roof is carelessly covered with pantiles or shingles, rarely with maize straw, and the wall has in it one or two wooden latticed windows. The interior corresponds with the light construction and scanty materials. The entrance, which is generally half or entirely closed by a latticed door, leads directly into the largest room in the house, which being without boards, and often with unwhitewashed walls, resembles a barn. This division serves for the habitation of the family. Store-rooms, and in some cases a side-room for guests, occupy the remainder of the front of the building. The back part contains the apartments for the wife and the rest of the family, who, according to the Portuguese fashion, must immediately withdraw on the entrance of strangers. From this we enter the veranda, which generally runs along the whole length of the building, and opens into the court-yard. A similar veranda is sometimes annexed to the front of the house. The kitchen and servants' apartments, generally miserable sheds, lie opposite the house, at the further end of the court. The furniture of these houses is confined to the most necessary articles; often they have no more than a few wooden benches and chairs, a table, a large chest, a bed, consisting of a straw mat, or an ox hide on boards, supported by four pegs (*giráo*). Instead of beds, the Brazilians almost always make use of the woven or braided hammocks (*marqueiras*), the best and most durable of which are manufactured, in the provinces of S. Paulo and Minas, of white or coloured cotton threads. The traveller nowhere meets with any wells, and must therefore be satisfied with rain, spring, or river water, for every purpose. The inhabitants of Taubaté have the appearance of more prosperity and refinement than those of the other small places through which we had before travelled; which is perhaps owing to their more lively intercourse with Rio de Janeiro and S. Paulo. A few vines also are cultivated here, the fruit of which was just ripe, and of an agreeable flavour.

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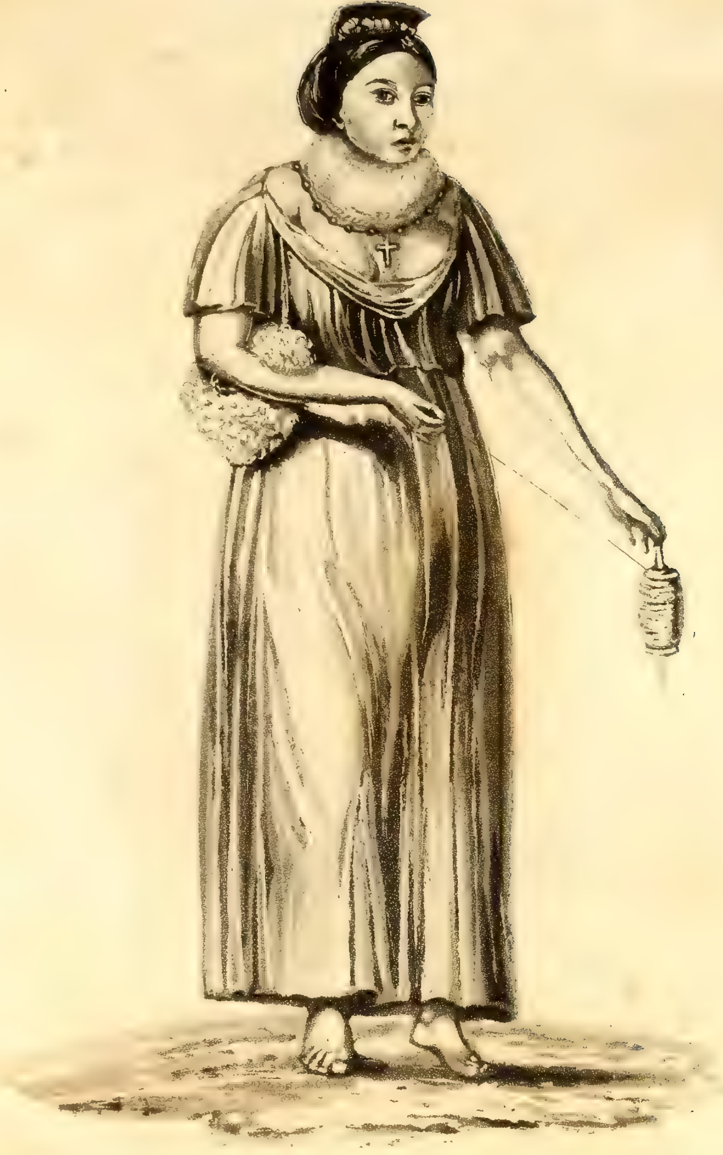
* Antonio Rodriguez, one of the first discoverers of the gold mines at Minas (1693) was a native of Taubaté.

Southwards of Taubaté the road extends through the valley of the Paraiba, over several woody and moist hills, which are covered with beautiful ferns, melastomas, and aroideæ, which thrive in wet situations. The low plain is likewise rich in the finest plants and insects: among others, we found here the *Cerambyx longimanus;* of birds, a new long-tailed brown *Tyrannus,* and the *Cuculus Guira.* After two days' journey through verdant plains alternating with low woods, in which we passed the vendas of Campo grande, Sahida do Campo, Paranangaba, and the small village of S. Jozé, we came to the villa of Jacarehy (which means, in the Lingua Geral, Crocodile river), where we allowed ourselves some refreshment. We here fell in again with the Paraiba, which makes a great bend, and, instead of proceeding further to the south, in its original direction, turns to the north. All the individuals of the party were carried over in a boat, but the mules were obliged to swim. In order to show them the direction they ought to take, one of them was led by a rope from the boat, and the others encouraged to follow by a constant noise and cry from the accompanying boats.

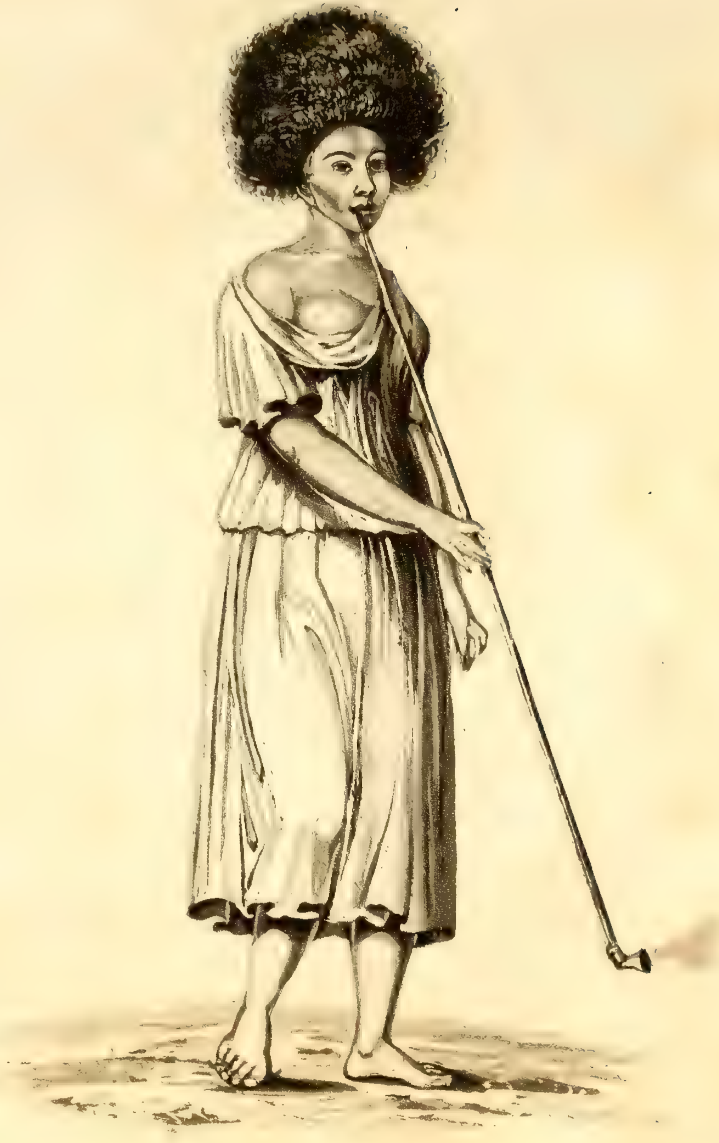
The Paraiba was at this time swelled by the frequent rains to the breadth of a hundred and seventy feet, and was very rapid. The navigation on this river is still very unimportant, probably because it has many considerable cataracts, chiefly in its lower part, or because the trade in its neighbourhood is still trifling, and the inhabitants, from want of bridges, cannot easily convey their produce. The part of it between Aldea da Escada and Pendamhongaba is that upon which there is the greatest traffic.

Among the inhabitants of this place we observed an endemic swelling of the glands of the neck in such a high degree as is perhaps nowhere to be found in Europe. Frequently the whole neck is covered with the great swelling, which gives a horrid appearance to these people, who are for the most part mulattoes, and have, independent of this, no very agreeable features. But in this country they seem to regard this swelling rather as a particular beauty than as a deformity; for we often saw the women adorn this enormous goitre with gold or silver ornaments, and, as it were, displaying it, while they sat before their house doors with a tobacco-pipe in the hand, or a reel to wind cotton. We have annexed a drawing of one of these women in her national costume. Negroes, mulattoes, descendants of whites and Indians (*mamelucos*), which form the greater part of its population, are peculiarly subject to this disorder; among the whites the women have it more commonly than the men. The causes of this deformity seem to be quite the same here as in other countries. For it does not occur in the high, colder, and airy mountainous districts, but in the low valley of the Paraiba, which is often covered with thick fogs. The reason of this is, that the direction of the two chains of mountains from S. to N. does not allow a free issue to the exhalations and vapours: the same mists which during the day rise from the river and the neighbouring marshes, which are partly covered with thick woods, fall again into the valley at night; the warmth is at the same time considerable; and the water of the river, which is often very muddy, impure, and lukewarm, must supply the place of spring water. Their habitations, too, are uncleanly, damp, and windy. The raw flour of maize, which is here more frequently used than that of mandiocca, and is, though more nourishing,



A MAMELUCA.

OF ST. PAULO.



A CAFUSA

OF ST. PAULO.

London. Published by Longman & Co. 29, March 1824.

more difficult of digestion, and eating much pork, may likewise contribute to the development of this disease: perhaps excess in sexual enjoyments may be considered as one cause of the goitre, as it is at Rio of the sarcocele and hydrocele. It is true, we do not here see the melancholy appearances of idiocy which are so frequently combined in Europe endemically with the goitre; yet the look of the persons who have the disorder in a high degree is not merely drowsiness and want of energy, but even stupidity, in the strict sense of the expression. It is customary to apply, at the commencement of the disease, poultices of warm gourds, the patient at the same time drinking water which has stood for several days upon the pounded mass of large ant-hills. The component parts of the ant-hills, which are from five to six feet high, in the construction of which the insect makes use of a peculiar animal slime as a cement, certainly seem capable of counteracting the causes which produce the goitre. Perhaps, too, the acid of ants may have a beneficial influence on the relaxed nerves of the patient, as well as on the debility of the lymphatic system. The negroes here, as in Africa, make much use of mucilaginous substances: they use, for instance, Gum Arabic against the goitre with good success; a mode of treatment which seems to point at the origin of this disease as proceeding from the diet.

In the course of our journey from Jacarehy, we met many Spanish fugitives belonging to the suite of the Bishop of Cordova. These victims of the political parties in Buenos Ayres, were received by the Paulistas with the most sincere commiseration, and humanely provided for during their long journey. The sending of troops from S. Paulo, to the Island of Saint Catharine, and from thence to Monte Video, had attracted the attention of the Paulistas to the political events in the south, and they thought by a hospitable reception of those fugitives, to establish the claims of their countrymen, now in that quarter, to equally good treatment. The Portuguese expedition to Monte Video had fallen heavily on the Paulistas, for not only troops of the line were sent upon it, but even a regiment of the militia, which occasioned a sensible chasm in the labouring class, and was attended with very lamentable consequences to many families.* As a great part of the militia perished in S. Catharina, and still more on the continent in the garrison of Monte Video, partly in battle, partly from longing for home, dysentery and other diseases the consequence of unusual hardship, a general discontent at this military expedition was excited in the whole province. The Paulista, it is true, is distinguished above most of the inhabitants of Brazil for obedience to the government; but the greatest dissatisfaction could not fail to be produced by a war, which in the eyes of the multitude was not carried on for urgent reasons, but rather in compliance with the opinions of a few, and to which the farmer, who till then had never been used to war, remained wholly indifferent, till he was roused on finding that it required the sacrifice of the lives and domestic happiness of many of his fellow-countrymen. Accordingly a great part of the militia deserted before they marched away, and fled sometimes with their whole families, either into the remote wildernesses of the capitania of S. Paulo, or to Minas Geraës, where they settled, and from which province, though demanded back, they were not given up, according to the privileges enjoyed by each capitania.

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* We were informed that on the whole twelve thousand men, of whom four thousand were Paulistas, carried on the war in Monte Video. This war, the necessity of which was affirmed by the minister Da Barca, but denied by many has, however, proved in latter times advantageous to Brazil, by giving it a natural boundary in the river La Plata.

In Aldea da Escada, a small village, three miles to the south of Jacarehy, which lies near a formerly numerous, but now abandoned, convent of Carmelites, at the foot of a gneiss mountain, and close to the Paraiba, we had the pleasure of meeting with a very sensible country priest, who was at the head of a mission for the Indians residing in that vicinity. He observed to us, that the sphere of his activity was daily lessened, in consequence of the royal mandate which has abolished the restraint of the missions over the Indians, and given them a perfect equality of rights with the other free natives. This ordinance has so far an unfavourable effect in all places where there are Indians under the superintendence or tutelage of Portuguese, because the former now withdraw more and more into the solitary forests. The mission had at present only sixty Indians under it, the rest had already dispersed throughout the province. They are not the remains of a single nation, but a mixture of several which possessed this country before it was occupied by the Portuguese. Their physiognomy was not very agreeable. The general characteristics of the race, gloomy stupidity, and reserve, which is especially indicated in the unsteady dark look, and the shy behaviour of the American, is increased on the first step towards reflection, by the constraint of civilisation to which he is wholly unused, and the intercourse with negroes, mestizoes, and Portuguese, to the most melancholy image of internal discontent and abasement. The manner in which they are treated by many of the present landholders contributes, indeed, to this moral and physical degeneracy. Neither national features, nor voluntary bodily mutilations, nor peculiar manners and customs of these poor remains of the ancient inhabitants, enable us to infer to what race they originally belonged. The language, too, of the Indians of this mission seems not be simple, but composed of several dialects, and to have adopted many words in particular from the Guaranis. It seems probable, from the accounts of historians.* that the tribe of the Goyanazes lived here, a, well as in the plain of Piratininga, or S. Paulos These latter are said to have been distinguished from their neighbours, the Tamoyós, and Cariós, by their custom of living in caves under ground, and not slaughtering the enemies whom they took prisoners, but treating them as slaves; and like the tribe of Goytacazes, who lived farther to the north, to have been a handsome, robust, warlike, and docile race. If the Indians now living at Aldea do Escada, in the neighbouring forests of the Mantiqueira, and Serra do Mar, were remains of those Goytacazes, this gradual degeneracy of the form and physiognomy of the aboriginal inhabitants, to the degree of deformity and ugliness for which they are now remarkable, as a consequence of an intercourse for a few centuries with white men, is a very singular phenomenon. It is difficult to imagine, that that warlike and enterprising nation should have been reduced, in this short period, to so small a number of individuals, and to such a state of degeneracy and insignificance, as to be rather an object of pity, than of historical interest. On the contrary, it is more probable that these Indians are remains of the less numerous and weaker nation of the Cariós and Guarús, who were enemies to the Goyanazes; other remnants of whom are said still to dwell under the name of the Sacurùs, in the Serra dos Orgâos.* Perhaps the Cariós have been mixed with some descendants of the Tamoyós, those savage and warlike cannibals, of whom the Portuguese, who first settled in the neighbourhood of Rio de Janeiro, drew the darkest picture, and against whom Don Antonio Salema, in the year 1572, undertook the last war of extermination.†

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* Southey's History of Brazil, vol. i. p. 34.

The people of the American continent have to show, in their earlier history, migrations similar to those by which the inhabitants of the high regions of middle Asia came to Europe. The researches of a celebrated traveller, seem to have placed it beyond all doubt, that the direction of these migrations on the whole was from north to south. We, too, shall have occasion, in the course of this narrative, to mention several facts which confirm this supposition. But, besides the great and general migrations, there have been several partial ones in different directions, and the arrival of the Europeans on the coast of Brazil, probably caused several of the more powerful tribes to retire from the coast, farther into the interior, so that only the weaker hordes, who thought they should be more secure by joining with the Portuguese and settling among them, remained in their ancient abodes. The Tupinambazes, the most important of all the nations which the Europeans found upon the coast, confirm this view by their extensive migration, and their gradual falling back from the coasts of Bahia and Pernambuco, to Maranhâo, Pará, and along the river Amazons, upwards as far as the mouth of the Madeira, where we saw the last remnant that the continued wars have left, in the village of Tupinambarána (now Villa Nova).

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* Father Casal (Corograf. Bras. ii. p. 46.) states, that the name Guarú, or Guarulho, is used collectively by several nations. But his accounts, as far as regards the Indian tribes, are very little to be depended upon.

† Southey's History of Brazil, vol. i. p. 312.

We passed the night in Tarumá, a solitary rancho in a plain bounded by forests, because we were too late to reach the village of Mogy das Cruces. In this part we met with several families of the people called Cafusos, who are a mixture of blacks and Indians. Their external appearance is one of the strangest that a European can meet with. They are slender and muscular, in particular the muscles of the breast and arms are very strong; the feet, on the contrary, in proportion, weaker. Their colour is a dark copper, or coffee brown. Their features, on the whole, have more of the Ethiopic than of the American race. The countenance is oval, the cheek-bones high, but not so broad as in the Indians; the nose broad and flattened, but neither turned up nor much bent; the mouth broad, with thick but equal lips, which, as well as the lower jaw, project but little; the black eyes have a more open and freer look than in the Indians, yet are still a little oblique, if not standing so much inward as in them, on the other hand, not turned outwards as in the Ethiopians. But what gives these mestizoes a peculiarly striking appearance is the excessively long hair of the head, which, especially at the end, is half curled and rises almost perpendicularly from the forehead to the height of a foot, or a foot and a half, thus forming a prodigious and very ugly kind of peruke. This strange head of hair, which, at first sight, seems more artificial than natural, and almost puts one in mind of the *plica polonica*, is not a disease, but merely a consequence of their mixed descent and the mean between the wool of the negro and the long stiff hair of the American. This natural peruke is often so high that the wearers must stoop low to go in and out of the usual doors of their huts; the thick hair is, besides, so entangled that all idea of combing it is out of the question. This conformation of the hair gives the Cafusos a resemblance with the Papuas in New Guinea; and we, therefore, thought it interesting to give the representation of a woman of that race in her peculiar costume.

The low mountains at Aldea da Escada are the last branches of the Serra do Mar. A small insignificant row of hillocks here unites the promontory of this chain with that of the Mantiqueira. The vegetation is exceedingly rich and luxuriant, and combines the forms of the mountain forests with the more delicate ones of the campos and the swamps. Large plumerias, echites, and other full-flowered apocyneæ, splendid hamelias, and high rhexias, covered with magnificent purple flowers, give to this district, in some parts, the appearance of a fairy land. At the time we passed through them, however, these plains seemed to be poor in animals, particularly insects. The mountain consists of gneiss, sometimes with much black shorl. Before we reached Mogy das Cruces, a small village about two miles from Tarumá, we saw, in many places, a reddish sandstone, which alternates with layers of clay. We gradually descended considerably, and at the bottom came to the river Tieté, the dark brown water of which flows here much more slowly than farther to the north-west, where it has many falls, till its junction with the Rio Paraná. At Mogy we were received with much cordiality and kindness by the capitâo. These good people entertained ideas of the Germans similar to those that the Greeks formerly had of the Hyperboreans. They were therefore interested, not only by the distance of our northern country, but by our external appearance. The female part of the family examined our dress with the simplicity and grace peculiar to the Paulistas, praising the fairness of our complexions, which is much admired here. A workman belonging to this family had been bitten a few days before by a venomous serpent (*schiraraca*) and died of the wound. A vial of *eau de luce,* which we left in this hospitable house as a remedy against similar accidents, obtained us blessings from the whole family. The country about Mogy is already pretty well cultivated; but the want of labourers, which has been partly caused by the march of the militia to the south, seems to be at present very sensibly felt.

On the last day of the year, after we had passed a wood, and a desolate tract of meadow ground which was for the most part swampy, and a pretty country-house, called Caza Pintada, three leagues and a half from the capital, we beheld before us, from the eminence of Nossa Senhora da Penha, the city of S. Paulo, standing upon a hill in a plain, which is partly covered with bushes or groves. Several large buildings give it, on this side, a very grand appearance; the most remarkable are — the residence of the governor, formerly the Jesuits' college; the Carmelite convent; and the episcopal palace. When we arrived in the city, we found, by the kind attention of one of our countrymen, a house ready for our reception, and fitted up as well as circumstances permitted. Mr. Daniel Peter Müller, Lieut.-colonel in the Royal Portuguese Engineers, whose father was at first clergyman of the Protestant German congregation, and afterwards secretary to the Society of Sciences at Lisbon, has retained, though brought up in Portugal from his earliest youth, the most affectionate regard for his original countrymen, and received us with a German cordiality and friendship which could not fail immediately to inspire us with the sincerest esteem and gratitude,—sentiments which we feel peculiar pleasure in being able thus publicly to acknowledge.

END OF THE FIRST VOLUME.

London:
Printed by A. & R. Spottiswoode,
New-Street-Square.